# AARUPADAI VEEDU INSTITUTE OF TECHNOLOGY, PAIYANOOR, CHENNAI
# &
# VINAYAKA MISSION'S KIRUPANANDA VARIYAR ENGINEERING COLLEGE,

VINAYAKA MISSION'S RESEARCH FOUNDATION
(Deemed to be University under section 3 of the UGC Act 1956)

**(Constituent Colleges of VinayakaMission's Research Foundation, Salem)**

**(AICTE APPROVED AND NAAC ACCREDITED)**

## Faculty of Engineering and Technology

## REGULATIONS-2021

**DEPARTMENT OF COMPUER SCIENCE AND ENGINEERING**

## Programme
## B.Tech – INFORMATION TECHNOLOGY

**Full Time**
**(4Years)**
**CHOICE BASED CREDIT SYSTEM (CBCS)**
**Curriculum (Semester I to VIII)**

**Regulation-2021**

Dr. M. NITHYA,
Prof & Head.
Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

# PROGRAMME OUTCOMES

Engineering Graduates will be able to:

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| PO1 | **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems. |
| PO2 | **Problem analysis**: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences. |
| PO3 | **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations. |
| PO4 | **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions. |
| PO5 | **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations. |
| PO6 | **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice. |
| PO7 | **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development. |
| PO8 | **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice. |
| PO9 | **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings. |
| PO10 | **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions. |
| PO11 | **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments. |
| PO12 | **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change. |

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# PROGRAMME SPECIFIC OUTCOMES(PSOS)

Graduating Students of Information Technology programme will be able to:

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| PSO1 | Demonstrate understanding of the principles and working of the hardware, software and Applications aspects of computer systems. |
| PSO2 | Understand, analyze and develop computer programs in the areas related to algorithms, system software, IT infrastructure, web design, data analytics and network programming for efficient design of Information Technology environment |
| PSO3 | Apply standard Protocols, Technologies and strategies to plan, design and execute projects for the development of intelligent systems with a focus on the future. |

# PROGRAMME EDUCATIONAL OBJECTIVES (PEOS)

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|---|---|
| PEO1 | Technical Expertise Implement fundamental domain knowledge of core courses for developing effective Information Technology solutions by incorporating creativity and logical reasoning. |
| PEO2 | Graduate will establish effective professionals by solving real world problems using investigative and analytical skills along with the knowledge acquired in the field of Information Technology. |
| PEO3 | Graduate will prove an ability to work and communicate effectively as a team member and/or leader to complete the task with minimal resources, meeting deadlines. |
| PEO4 | Graduate will demonstrate his/her ability to adapt to rapidly changing environment in advanced areas of Computer Science, Information Technology, network security and scalene weight in their profession through life long learning. |

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**STRUCTURE OF UNDER GRADUATE ENGINEERING PROGRAM– REGULAR STUDENTS**

| Sl.No. | Category of Courses | Types of Courses | | Suggested Breakup of Credits (min– max) |
|---|---|---|---|---|
| 1. | **A.** Foundation Courses | Humanities and Social Sciences including Management courses | | 9-12 |
| 2. | | Basic Science courses | | 18-25 |
| 3. | | Engineering Science courses including workshop, drawing, basics of electrical/mechanical/computer etc. | | 18-24 |
| 4. | **B.** Professional | Core courses | | 48-54 |
| 5. | C. Elective Courses | Professional Electives | | 12 |
| | | Industry Designed/ Industry Supported Industry Offered/ Industry Sponsored courses | | 6 |
| | | Open Electives | Innovation, Entrepreneurship, Skill Development etc. | 6-9 |
| | | | Emerging Areas like 3DPrinting,Artificial Intelligence, Internet of Things etc. | 6-9 |
| 6. | **D.** Courses for Presentation of technical Skills related to the Specialization | Project work | | 8 |
| | | Mini Project | | 3 |
| | | Seminar | | 1 |
| | | Internship in industry or else where | | 3 |
| 7. | ****E .Mandatory Courses** | Indian Constitution, Essence of Indian Traditional Knowledge, Yoga/NCC/NSS/RRC/YRC/ Sports and Games, Student Clubs, Unnat Bharat Abhiyan, Swachh Bharat etc. | | Zero credit (Minimum 2 courses to be completed other than yoga and Practice) |
| | | | **Minimum Credits to be earned** | 160 |

****The credits earned in category 'E' Courses will not be counted in CGPA calculation forwarding of thedegree.**

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## STRUCTURE OF UNDER GRADUATE ENGINEERING

## PROGRAM –LATERAL ENTRY STUDENTS

| Sl. No. | Category of Courses | Types of Courses | | Suggested Break up of Credits(110–120) |
|---|---|---|---|---|
| 1. | **A.** Foundation Courses | Humanities and Social Sciences including Management courses | | 3–6 |
| 2. | | Basic Science courses | | 3–6 |
| 3. | | Engineering Science courses including workshop, drawing, and basics of electrical/mechanical/ computer etc. | | 5–9 |
| 4. | **B.** Professional | Core courses | | 48-54 |
| 5. | **C.** Elective Courses | Professional Electives | | 12 |
| | | Industry Designed/ Industry Supported/ Industry Offered/Industry Sponsored Courses | | 6 |
| | | Open Electives | Innovation, Entrepreneurship, Skill Development etc. | 6-9 |
| | | | Emerging Areas like 3DPrinting, Artificial Intelligence, Internet ofThings etc. | 6-9 |
| 6. | **D.** Courses for Presentation of technical Skills related to the specialization | Project work | | 8 |
| | | Mini Project | | 3 |
| | | Seminar | | 1 |
| | | Internship in industry or else where | | 3 |
| 7. | ****E .Mandatory Courses** | Indian Constitution, Essence of Indian Traditional Knowledge,, Yoga/NCC/NSS/RRC/YRC/ Sports and Games, Student Clubs, Unnat Bharat Abhiyan, Swachh Bharat etc. | | Zero credit (Minimum 2 courses to be completed other than yoga and Practice) |
| **Minimum Credits to be earned** | | | | 120 |

**** The credits earned in category 'E' Courses will not be counted in CGPA calculation forawarding of the degree.**

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**DEPARTMENT COMPUTER SCIENCE AND ENGINEERING**

**INFORMATION TECHNOLOGY**

**Regulation-2021**

CURRICULUM

| A.FoundationCourses | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Humanities and Social Sciences including Management courses–Credits(9-12)** | | | | | | | | | |
| **Sl No** | **CourseCode** | **Course** | **Offering Dept** | **Category** | **L** | **T** | **P** | **C** | **Pre-requisitee** |
| 1 | 34121H01 | TECHNICAL ENGLISH | ENG | FC-HS | 3 | 0 | 0 | 3 | NIL |
| 2 | 34121H04 | BUSINESS ENGLISH | ENG | FC-HS | 3 | 0 | 0 | 3 | NIL |
| 3 | 34121H81 | ENGLISH LANGUAGE LAB | ENG | FC-HS | 0 | 0 | 4 | 2 | NIL |
| 4 | 34121H82 | PROFESSIONAL COMMUNICATION AND PERSONALITY DEVELOPMENT LAB | ENG | FC-HS | 0 | 0 | 2 | 1 | NIL |
| 5 | 34121H02 | TOTAL QUALITY MANAGEMENT | MANAG | FC-HS | 3 | 0 | 0 | 3 | NIL |
| 6 | 34121H83 | UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY | ENG | FC-HS | 3 | 0 | 0 | 3 | NIL |
| Basic Science Courses – Credits (18-25) | | | | | | | | | |
| 1. | 34121B01 | ENGINEERING MATHEMATICS | MATH | FC-BS | 2 | 1 | 0 | 3 | NIL |
| 2. | 34121B20 | ADVANCED ENGINEERING MATHEMATICS | MATH | FC-BS | 2 | 1 | 0 | 3 | NIL |
| 3. | 34121B17 | PROBABILITY AND QUEUING THEORY | MATH | FC-BS | 2 | 1 | 0 | 3 | NIL |
| 4. | 34121B36 | STATISTICAL FOUNDATION | MATH | FC-BS | 2 | 1 | 0 | 3 | NIL |
| 5. | 34121B21 | DISCRETE MATHEMATICS | MATH | FC-BS | 2 | 1 | 0 | 3 | NIL |
| 6. | 34121B04 | PHYSICAL SCIENCES | PHY &CHEM | FC-BS | 4 | 0 | 0 | 4 | NIL |
| 7. | 34121B05 | SMART MATERIALS AND NANOTECHNOLOGY | PHY | FC-BS | 3 | 0 | 0 | 3 | PHYSICAL SCIENCES |
| 8. | 34121B81 | PHYSICAL SCIENCES LAB | PHY &CHEM | FC-BS | 0 | 0 | 4 | 2 | NIL |
| 9. | 34121B19 | ENVIRONMENTAL SCIENCES | CHEM | FC-BS | 3 | 0 | 0 | 3 | NIL |



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| Engineering Science courses including Workshop , Drawing, Basics of Electrical / Mechanical / Computer etc.,Credits–(18-24) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 35021E01 | FOUNDATIONS OF COMPUTING AND PROGRAMMING (THEORY AND PRACTICAL) | CSE | FC-ES | 2 | 0 | 2 | 3 | NIL |
| 2 | 34621E01 | BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING | EEE&ECE | FC-ES | 4 | 0 | 0 | 4 | NIL |
| 3 | 35021E02 | PYTHON PROGRAMMING (THEORY AND PRACTICALS ) | CSE | FC-ES | 2 | 0 | 2 | 3 | NIL |
| 4 | 34421E01 | BASICS O F CIVIL AND MECHANICAL ENGINEERING | CIVIL&MECH | FC-ES | 4 | 0 | 0 | 4 | NIL |
| 5 | 34621E81 | BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING LAB | EEE&ECE | FC-ES | 0 | 0 | 4 | 2 | NIL |
| 6 | 34421E84 | ENGINEERING SKILLS PRACTICALS LAB | CIVIL&MECH | FC-ES | 0 | 0 | 4 | 2 | NIL |
| 7 | 34421E81 | ENGINEERING GRAPHICS AND DESIGN | MECH | FC-ES | 1 | 0 | 4 | 3 | NIL |
| 8 | 35021E03 | PROGRAMMING FOR PROBLEM SOLVING | CSE | FC-ES | 3 | 0 | 0 | 3 | NIL |
| **B. Professional Core Courses–Credits(48-54)** | | | | | | | | | |
| 1. | 35021C02 | DATA STRUCTURES | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 2. | 35021C01 | COMPUTER ARCHITECTURE AND ORGANIZATION | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 3. | 35021C18 | OPERATING SYSTEM (THEORY AND PRACTICALS) | CSE | CC | 3 | 0 | 2 | 4 | NIL |
| 4. | 35021C05 | DESIGN AND ANALYSIS OFALGORITHMS | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 5. | 35021C04 | DATABASE MANAGEMENT SYSTEMS | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 6. | 35021C06 | OBJECT ORIENTED PROGRAMMING | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 7. | 35021C08 | COMPILER DESIGN AND AUTOMATA THEORY | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 8. | 35021C09 | COMPUTER NETWORKS (THEORY AND PRACTICALS) | CSE | CC | 3 | 0 | 2 | 4 | NIL |

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|---|---|---|---|---|---|---|---|---|---|
| 9. | 35021C13 | SOFTWARE ENGINEERING | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 10. | 35021C16 | JAVA PROGRAMMING | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 11. | 35021C20 | WEB TECHNOLOGY (THEORY AND PRACTICAL) | CSE | CC | 3 | 0 | 2 | 4 | NIL |
| 12. | 35121C04 | HIGH SPEED NETWORKS | IT | CC | 3 | 0 | 0 | 3 | NIL |
| 13. | 35921C06 | INTERNET OF THINGS AND ITS APPLICATIONS | AIDS | CC | 3 | 0 | 0 | 3 | NIL |
| 14. | 35121C02 | CYBER SECURITY PRINCIPLES | IT | CC | 3 | 0 | 0 | 3 | NIL |
| 15. | 35121C05 | IT INFRASTRUCTURE MANAGEMENT | IT | CC | 3 | 0 | 0 | 3 | NIL |
| 16. | 35021C83 | DATABASE MANAGEMENT SYSTEMS LAB | CSE | CC | 0 | 0 | 4 | 2 | NIL |
| 17. | 35021C84 | OBJECT ORIENTED PROGRAMMING LAB | CSE | CC | 0 | 0 | 4 | 2 | NIL |
| 18. | 35021C88 | JAVA PROGRAMMING LAB | CSE | CC | 0 | 0 | 4 | 2 | NIL |
| 19. | 35021C82 | DATA STRUCTURES LAB | CSE | CC | 0 | 0 | 4 | 2 | NIL |
| 20. | 35021C07 | ARTIFICIAL INTELLIGENCE | CSE | CC | 3 | 0 | 0 | 3 | NIL |
| 21. | 35021C85 | ARTIFICIAL INTELLIGENCE LAB | CSE | CC | 0 | 0 | 4 | 2 | NIL |
| 22. | 35921C05 | FOUNDATIONS OF DATA SCIENCE | AIDS | CC | 3 | 0 | 0 | 3 | NIL |
| 23. | 35021C89 | PYTHON FOR DATA SCIENCE LAB | CSE | CC | 0 | 0 | 4 | 2 | NIL |
| 24. | 35121C01 | CONGNITIVE SCIENCES | IT | CC | 3 | 0 | 0 | 3 | NIL |
| 25. | 35121C06 | WEB ESSENTIALS | IT | CC | 3 | 0 | 0 | 3 | NIL |
| 26. | 35121C03 | FULL STACK WEB DEVELOPMENT | IT | CC | 3 | 0 | 0 | 3 | NIL |
| C. Professional Elective courses (12) | | | | | | | | | |
| Professional Elective courses relevant to chosen specialization/branch Credits-(12) | | | | | | | | | |
| 1. | 35021P03 | BIG DATA AND ANALYTICS | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 2. | 35021P17 | ETHICAL HACKING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 3. | 35021P24 | MOBILE COMPUTING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |



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| 4. | 35021P01 | UNIX INTERNALS | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 5. | 35021P36 | WIRELESS AND SENSOR NETWORK | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 6. | 35121P03 | TCP / IP PROTOCOL SUITE | IT | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 7. | 35021P05 | C# AND .NET APPLICATION DEVELOPMENT | CSE | EC-PS | 3 | 0 | 0 | 3 | OBJECT ORIENTED PROGRAMMING |
| 8. | 35021P06 | CLOUD COMPUTING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 9. | 35021P02 | AGILE METHODOLOGIES | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 10. | 35021P23 | MACHINE LEARNING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 11. | 35021P13 | DEEP LEARNING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 12. | 35021P12 | DATA VIRTUALIZATION | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 13. | 35021P10 | DATA MINING | CSE | EC-PS | 3 | 0 | 0 | 3 | DATABASE MANAGEMENT SYSTEMS |
| 14. | 35021P08 | COMPUTER GRAPHICS AND MULTIMEDIA | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 15. | 35021P26 | NETWORK DESIGN AND MANAGEMENT | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 16. | 35021P34 | SOFTWARE TESTING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 17. | 35921P05 | HUMAN COMPUTER INTERACTION | AIDS | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 18. | 35021P04 | BLOCK CHAIN TECHNOLOGY | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 19. | 35021P19 | GO PROGRAMMING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 20. | 35021P28 | R PROGRAMMING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 21. | 35021P30 | RICH INTERNET APPLICATION | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 22. | 35021P27 | OBJECT ORIENTED ANALYSIS AND DESIGN | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 23. | 35021P18 | GAME THEORY | CSE | EC-PS | 3 | 0 | 0 | 3 | ENGINEERING MATHAMETICS |
| 24. | 35021P20 | INFORMATION RETRIEVAL TECHNIQUES | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 25. | 35021P33 | SOFTWARE QUALITY MANAGEMENT | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 26. | 35121P01 | NETWORK PROTOCOLS AND PROGRAMMING | IT | EC-PS | 3 | 0 | 0 | 3 | NIL |



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| 27. | 35021P31 | SCALA PROGRAMMING | CSE | EC-PS | 3 | 0 | 0 | 3 | JAVA PROGRAMMING |
| 28. | 35121P02 | SERVICE ORIENTED ARCHITECTURE | IT | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 29. | 35021P11 | DATA SCIENCE IN PYTHON | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| 30. | 35021P14 | DIGITAL MARKETING | CSE | EC-PS | 3 | 0 | 0 | 3 | NIL |
| Industry Designed / Industry Supported / Industry Offered / Industry Sponsored courses– Credits - (6) | | | | | | | | | |
| 1 | 34121I07 | BUSINESS INTELLIGENCE AND ITS APPLICATIONS | INFOSYS | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 2 | 34121I06 | BUILDING ENTERPRISE APPLICATIONS | INFOSYS | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 3 | 34121I15 | INTERNET AND WEB TECHNOLOGY | INFOSYS | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 4 | 35021I01 | LEARNING IT ESSENTIALS BY DOING | INFOSYS | EC- IE | 3 | 0 | | 3 | NIL |
| 5 | 34121I13 | ESSENTIALS OF INFORMATION TECHNOLOGY | INFOSYS | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 6 | 34121I16 | INTRODUCTIONTO MAIN FRAMES | INFOSYS | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 7 | 34121I20 | MOBILE APPLICATION DEVELOPMENT | INFOSYS | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 8 | 34121I10 | CYBER FORENSICS | AVANZ OTECH | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 9 | 34121I09 | CRYPTOGRAPHY AND NETWORK SECURITY | AVANZ OTECH | EC- IE | 3 | 0 | 0 | 3 | NIL |
| 10 | 34121I08 | CLOUD DATABASE MANAGEMENT AND SECURITY | SALEM INFOTECH | EC- IE | 3 | 0 | 0 | 3 | NIL |
| Open Electives – Electives from Innovation, Entrepreneurship, Skill Development etc. Credits - (6-9) | | | | | | | | | |
| 1. | 34121O03 | FINANCE AND ACCOUNTING FOR ENGINEERS | MANAG | OE-IE | 3 | 0 | 0 | 3 | NIL |
| 2. | 34121O04 | INNOVATION, PRODUCT DEVELOPMENT AND COMMERCIALIZATION | MANAG | OE-IE | 3 | 0 | 0 | 3 | NIL |
| 3. | 34121O07 | SOCIAL ENTREPRENEURSHIP | MANAG | OE-IE | 3 | 0 | 0 | 3 | NIL |
| 4. | 34121O01 | ENGINEERING STARTUPS AND ENTREPRENEURIAL MANAGEMENT | MANAG | OE-IE | 3 | 0 | 0 | 3 | NIL |



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| 5. | 34121O06 | NEW VENTURE PLANNING AND MANAGEMENT | MANAG | OE-IE | 3 | 0 | 0 | 3 | NIL |
| 6. | 34121O02 | INTELLECTUAL PROPERTY RIGHTS | MANAG | OE-IE | 3 | 0 | 0 | 3 | NIL |
| **Open subjects–Electives from other Emerging Areas Credits - (6-9)** | | | | | | | | | |
| 1. | 34421O01 | 3DPRINTING AND ITS APPLICATIONS | MECH | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 2. | 34421O02 | INDUSTRIAL ROBOTICS | MECH | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 3. | 36921O01 | BIOMOLECULES - STRUCTURE AND FUNCTION | PE | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 4. | 36921O02 | PHARMA COGENOMICS | PE | OE- EA | 3 | 0 | 0 | 3 | NIL |
| 5. | 34221O02 | MUNICIPAL SOLID WASTE MANAGEMENT | CIVIL | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 6. | 34221O01 | DISASTER RISK MANAGEMENT | CIVIL | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 7. | 34621O01 | GREEN POWER GENERATION SYSTEMS | EEE | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 8. | 34621O02 | INDUSTRIAL DRIVES AND AUTOMATION | EEE | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 9. | 38121O01 | FOOD AND NUTRITION TECHNOLOGY | BTE | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 10. | 38121O02 | INTRODUCTION TO BIO-FUELS | BTE | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 11. | 35321O03 | PRINCIPLES OF BIOMEDICAL INSTRUMENTATION | BME | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 12 | 35321O01 | BIO SENSORS AND TRANSDUCERS | BME | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 13. | 34721O02 | INTRODUCTION TO INDUSTRY 4.0 AND INDUSTRIAL INTERNET OF THINGS | ECE | OE-EA | 3 | 0 | 0 | 3 | NIL |
| 14. | 34721O01 | DESIGN OF ELECTRONIC EQUIPMENT | ECE | OE-EA | 3 | 0 | 0 | 3 | NIL |
| **D. Courses for Presentation of Technical Skills related other specialization (15)** | | | | | | | | | |
| 1 | 35121R01 | PROJECT WORK | IT | PI-P | 0 | 0 | 16 | 8 | NIL |
| 2 | 35121M81 | MINI PROJECT | IT | PI-M | 0 | 0 | 6 | 3 | NIL |



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|---|---|---|---|---|---|---|---|---|---|
| 3 | 35121S81 | SEMINAR | IT | PI-S | 0 | 0 | 2 | 1 | NIL |
| 4 | 35121T81 | INTERNSHIP | IT | PI-T | 3WEEKS | | | 3 | NIL |
| **E. Mandatory courses (2 Credits) (Not included for CGPA calculations)** | | | | | | | | | |
| 1 | 34121Z81 | YOGA AND MEDITATION | PHED | AC | 0 | 0 | 2 | 1 | NIL |
| **Any two of the Following Courses** | | | | | | | | | |
| 2 | 34121Z82 | GENDER EQUITY AND LAW | LAW | AC | 0 | 0 | 2 | 0 | NIL |
| 3 | 34121Z83 | ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE | GEN | AC | 1 | 0 | 0 | 0 | NIL |
| 4 | 34121Z84 | INDIAN CONSTITUTION | LAW | AC | 1 | 0 | 0 | 0 | NIL |
| 5 | 34121Z85 | NCC / NSS / RRC / YRC/ STUDENT CLUBS/UNNAT BHARATH ABHIYAN/SWACTH BHARAT | GEN | AC | 3WEEKS | | | | NIL |
| 6 | 34121Z86 | SPORTS AND GAMES | PHED | AC | 1 | 0 | 0 | 0 | NIL |

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| 34121H01 | TECHNICAL ENGLISH | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-HS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Technical English is a life skill course necessary for all students of Engineering and Technology. It aims at developing communication skills in English, essential for understanding and expressing the ideas of different professional context. The outcome of the course is to help the students acquire the language skills of Listening, Speaking, Reading and Writing competency in English language and thereby making the students competent and employable in the globalized scenario.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To enable students to develop LSRW skills in English. (Listening, Speaking, Reading, and Writing.) |
| **2.** | To make them become effective communicators |
| **3.** | To ensure that learners use Electronic media materials for developing language |
| **4.** | To aid the students with employ ability skills. |
| **5.** | To develop the students communication skills in formal and informal situations |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Listen, remember and respond to others in different scenario | Remember |
| **CO2.** Understand and speak fluently and correctly with correct pronunciation in different situation. | Understand |
| **CO3.** To make the students experts in professional writing | Apply |
| **CO4.**. To make the students in proficient technical communicator | Apply |
| **CO5.** To make the students recognize the role of technical writing in their careers in business, technical and scientific field | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | - | L | L | M | M | M | - | S | - | S | S | - | S |
| CO2 | - | - | - | - | - | - | L | - | - | S | - | S | M | - | S |
| CO3 | - | - | - | L | - | - | - | L | - | - | - | L | M | M | - |
| CO4 | L | - | - | - | - | M | - | L | M | S | L | S | S | M | S |
| CO5 | M | - | L | S | - | - | - | - | - | - | - | S | M | - | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**SELF INTRODUCTION**

Self introduction - Simulations using E Materials - Whats app, Face book, Hiker, Twitter- Effective Communication with Minimum Words - Interpretation of Images and Films - Identify the different Parts of Speech- Word formation with Prefixes and suffixes -Common Errors in English -Scientific Vocabulary (definition and meaning)– Technical Abbreviations and Acronyms -Listening Skills- Passive and Active listening, Listening to Native Speakers - Characteristics of a good listener.

**STRESS**

Articles - Phonetics (Vowels, Consonants and Diphthongs) - Pronunciation Guidelines -Listening to Indian speakers from different regions, intrusion of mother tongue - Homophones – Homonyms - Note taking and Note making - Difference between Spoken and Written English- Use of appropriate language - Listening and Responding to Video Lectures (Green India, environment, social talks, New Norms) - Extempore.

**SPEAKING SKILLS**

Tense forms- Verbal and Non verbal Communication - Describing objects - Process Description- Speaking Practice - Paragraph Writing on any given topic (My favourite place, games / Hobbies / School life, etc.) -Types of paragraphs - Telephone Etiquette - Telephonic conversation with dialogue- Interpersonal Skills.

**READING SKILLS**

English as language of Opportunity and Employ ability- Impersonal Passive Voice - Conditional Sentences - Technical and Non technical Report Writing (Attend a technical seminar and submit a report) - News Letters and Editing - Skimming- Scanning - How to Improve Reading Speed - Designing Invitations and Poster Preparation – Technical Jargon's

**TECHNICAL WRITING**

Sentence Pattern (SVOCA) - Statement of Comparison - Trans coding (Flow Chart, Bar Chart and Pie Chart) – Informal and Formal letters – Application letter- Resume Writing- Difference among Bio data, Resume and Curriculum Vitae.

**TEXTBOOK**

1. English for Engineers- Faculty of English – VMKV Engineering College, Salem and AVIT, Chennai

**REFERENCE BOOKS**


1. 1. English for Effective Communication, Department of English, VMKV & AVIT, SCM Publishers, 2009.
2. Practical English Usage- Michael Swan (III edition), Oxford University Press
3. Grammar Builder- I, II, III, and Cambridge University Press.

4 Pickett and Laster. Technical English: Writing, Reading and Speaking, New York: Harper and Row Publications, 2002.


**COURSE DESIGNERS**

| S. No | Name of the Faculty | Designation | Name of the College | Mail ID |
|---|---|---|---|---|
| **1.** | Dr. Jennifer G Joseph | Prof. and Head, H&S | **AVIT** | Jennifer@avit.ac.in |
| **2.** | Dr.P.Saradha | Associate Professor | **VMKVEC** | saradhap@vmkvec.edu.in |

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| 34121H04 | BUSINESS ENGLISH | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-HS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Language is one of the most valued possessions of men. It acts as a repository of wisdom. Among all other languages English, the international language plays a vital role as a propeller for the advancement of knowledge in different fields and as a telescope to view the dream of the future.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To impart and enhance corporate communication. |
| **2.** | To enable learners to develop presentation skills |
| **3.** | To build confidence in learners to use English in Business context |
| **4.** | To make them experts in professional writing |
| **5.** | To equip students with employ ability and job searching skills |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Communicate with a range of formal and informal context | Understand |
| **CO2.** demonstrate interaction skills and consider how own communication is adjusted in different scenario | Apply |
| **CO3.** Use strengthened oral and written skills in the business context | Apply |
| **CO4. Create interest in a topic by exploring thoughts and ideas** | Apply |
| **CO5.** Have better performance in the art of communication | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | L | - | L | S | S | - | M | S | - | S | S | - | - |
| CO2 | - | M | S | M | - | M | M | - | L | S | - | S | M | - | - |
| CO3 | L | M | - | - | - | M | - | L | - | S | L | M | - | M | - |
| CO4 | - | L | M | M | - | - | L | M | M | S | L | M | M | - | M |
| CO5 | - | L | - | M | - | L | L | - | - | S | - | S | M | M | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**Basics of Language and Listening Skills:** Subject and Verb Agreement (concord) - Preposition and Relative Pronoun - Cause and effect - Phrasal Verbs-Idioms and phrases-Listening Comprehension -Listening to Audio Files and Answering Questions-Framing Questions-Negotiation Skills-Presentation Skills and Debating Skills

**STRESS:** Stress (Word Stress and Sentence Stress) Intonation- Difference between British and American English Vocabulary-Indian ism-Compound Words (including Technical

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Terminology) Jargon's- Technical and Business

**SPEAKING SKILLS AND READING SKILLS:** Extempore**,** Listening to TED Talks and discussion on the topic heard, Speaking activities- pair and group designed by the faculty, Group Discussion-Types of Interviews, Watching Documentary Films and Responding to Questions, Reading Skills-Understanding Ideas and making Inferences-– FAQs – E - Mail Netiquette - Sample E – mails , Critical Reading-Book Review-Finding Key Information and Shifting Facts from Opinions

**CORPORATE COMMUNICATION:** What is Corporate Communication? Types of Office communications -Recommendation-Instruction-Check List- Circulars-Inter Office Memo-Minutes of Meeting and Writing Agenda - Discourse Markers - Rearranging Jumbled Sentences

**WRITING SKILLS** Technical Articles – Written communication Project Proposals-Making Presentations on given Topics -Preparing Power Point Presentations-Business Letters (Calling for Quotation, Placing Orders and Complaint Letters) - Expansion of an Idea-Creative Writing.

**TEXTBOOK**

1. English for Effective Communication - Faculty of English – VMKV Engineering College, Salem and AVIT, Chennai

**REFERENCE BOOKS**

1. Grammar Builder – I, II, III – Cambridge University Press.
2. Technical English – Writing, Reading and Speaking – Pickett and Lester, Harper and Row

**Course Designers:**

| S. No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| 34121H81 | ENGLISH LANGUAGE LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-HS | 0 | 0 | 4 | 2 |

**PREAMBLE**

English Language Laboratory provides technological support to students. It acts as a platform for learning, practicing and producing language skills through interactive lessons and communicative mode of teaching.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To understand communication nuisances in the corporate sector. |
| **2.** | To understand the role of mother tongue in second language learning and to avoid interference of mother tongue. |
| **3.** | To improve the oral skills of the students communicate effectively through different activities |
| **4.** | To understand and apply the telephone etiquette |
| **5.** | Case study to understand the practical aspects of communication |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Give best performance in group discussion and interview | Understand |
| **CO2.** Best performance in the art of conversation and public speaking. | Apply |
| **CO3.** Give better job opportunities in corporate companies | Apply |
| **CO4.** Better understanding of nuances of English language through audio-visual experience and group activities | Apply |
| **CO5.** Speaking skills with clarity and confidence which in turn enhances their employ ability skills | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | S | M | S | - | L | - | - | S | S | M | - | - | - | M |
| CO2 | M | - | - | - | - | - | - | - | M | S | - | M | M | - | M |
| CO3 | M | - | - | - | - | - | - | - | - | S | - | M | - | - | M |
| CO4 | M | - | - | - | - | - | - | - | - | M | - | - | M | - | M |
| CO5 | M | - | - | S | - | - | - | - | - | M | - | - | M | - | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**MODULE I:** Ice Breaker, Grouping, Listening- ( Hearing and listening)- Active Listening- Passive Listening – Listening to songs, videos and understanding- (fill in the blanks) Telephone Conversation

**MODULE II:** Influence of mother tongue, videos, understanding nuances of English language (video) puzzle to solve, Activity.

**MODULE III:** Why is English important, Communication skills, TED (video) Communication in different scenario – a case study, ingredients of success, Activity – chart, speak the design, feedback on progress, Group wise, Individual. Role Play

**MODULE IV:** Telephone Etiquette, Dining Etiquette, Meeting Etiquette, Corporate Etiquette, Business Etiquette.

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**MODULE V:** Case study of Etiquette in different scenario.

**Course Designers:**

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|---|---|---|---|---|
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| 34121H82 | PROFESSIONAL COMMUNICATION AND PERSONALITY DEVELOPMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-HS | 0 | 0 | 2 | 1 |

**PREMABLE:**

To develop students with good presentation and writing skills (Professionally & technically). Articulate and enunciate words and sentences clearly and effectively. Develop proper listening skills. Understand different writing techniques and styles based on the communication being used.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To develop communication and personality skills. |
| **2.** | To improve Aptitude skills, train to improve self-learning / researching abilities, presentation skills & technical writing. |
| **3.** | To improve students employ ability skills. |
| **4.** | To develop professional with idealistic, practical and moral values. |
| **5.** | To produce cover letters, resumes and job application strategies. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Improve communication and personality skills. | Apply |
| CO2. Demonstrate effective use of team work skills and presentation skills to complete given tasks. | Apply |
| **CO3.** Speak with clarity and confidence thereby enhancing employ-ability skillsof the students. | Apply |
| **CO4.** Have balanced value system that can be practiced for enhanced professional life. | Apply |
| **CO5.** Improve their vocabulary and use them in appropriate situation | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | - | - | - | M | M | - | M | S | - | - | - | - | - |
| CO2 | M | - | - | - | - | - | - | - | S | M | - | - | - | - | - |
| CO3 | - | - | - | - | - | - | M | - | S | S | - | - | - | - | - |
| CO4 | - | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO5 | S | - | - | - | - | - | - | - | M | S | - | M | - | - | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**UNIT – I: COMMUNICATION AND SELF DEVELOPMENT:** Basic Concepts of Communication; Barriers in Communication; How to Overcome Barriers to Communication, Barriers and Filters in Listening Skill, Active and Passive listening, exposure to English language through various activities and maintaining a vocabulary dairy improving confidence in Language usage using activities,

**UNIT – II: GRAMMAR & SYNTAX:** Subject verb concord, tenses, Homophones, Homonyms, Spotting errors.

**UNIT – III. READING AND WRITING SKILLS:** Reading Comprehension; and suggesting title for given passage Back office job for organizing a conference / seminar (member of organizing committee and submit a report); Jumbled sentences, respond to real time advertisement and prepare a covering letter with CV.

**UNIT IV. SPEAKING SKILLS AND ESSENCE OF SOFT SKILLS:** Hard and soft Skills; Feedback Skills; Skills of Effective Speaking; Component of an effective Talk; how to make an effective oral presentation, Time management, Team work skills, Leadership skills, Adaptability and bettering oneself, Persuasion skills.

**UNIT V TECHNICAL REPORT, RESEARCH CASE STUDY & REPORTING:** Types and Structure of Reports; Collecting Data; Technical Proposals; Visual Aids; General Tips for Writing Reports. Research Case Study and reporting, how to make an effective power point presentation

**TEXTBOOK**

1. The Functional Aspects of Communication Skills, Prajapati Prasad and Rajendra K.Sharma, S. K Kataria& Sons, New Delhi, Rep’’nt 2007

**REFERENCES**

**1.** Business Communication, Sinha K. K. S. Chand, New Delhi.
**2.** Business Communication, Asha Kaul, Prentice Hall of India
**3.** Business Correspondence and Report Writing A Practical Approach to Business and Technical Communication, Sharma, R.C.and Krishna Mohan, Tata Mc Graw – Hill.

**Course Designers:**

**COURSE DESIGNERS**



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| 34121H02 | TOTAL QUALITY MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-HS | 3 | 0 | 0 | 3 |

**PREAMBLE:**

Quality is the mantra for success or even for the survival of any organization in this competitive global market. Total Quality Management (TQM) is an enhancement to the traditional way of doing business. TQM integrates fundamental management techniques, existing improvement efforts, and technical tools under a disciplined approach for providing quality of products and processes. It becomes essential to survive and grow in global markets, organizations will be required to develop customer focus and involve employees to continually improve Quality and keep sustainable growth.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES:**

**1.** To understand the Total Quality Management concepts.

**2.** To practice the TQM principles.

**3.** To apply the statistical process control

**4.** To analyze the various TQM tools

**5.** To adopt the quality systems.

**COURSE OUTCOMES:**

After successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand the importance of quality and TQM at managerial level. | Understand |
| **CO2:** Practice the relevant quality improvement tools to implement TQM. | Apply |
| **CO3:** Analyse various TQM parameters with help of statistical tools. | Analysing |
| **CO4:** Assess various TQM Techniques. | Evaluate |
| **CO5:** Practice the Quality Management Systems in a different organization Environment. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | - | - | - | - | L | L | L | M | L | M | - | - | - |
| CO2 | M | - | - | - | L | L | - | L | M | M | - | L | - | - | M |
| CO3 | S | S | M | S | S | - | - | L | - | L | - | L | L | M | L |
| CO4 | L | M | S | L | M | - | L | - | L | M | L | M | - | - | - |
| CO5 | L | L | M | - | L | M | S | S | M | L | L | M | - | - | M |

**S- Strong; M-Medium; L-Low**

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**SYLLABUS:**

**INTRODUCTION**

Concept of Quality and Quality Management - Determinants of quality of product & service - Quality costs – Analysis Techniques for Quality Costs – TQM Principles and Barriers & Implementation – Leadership – Concepts- Role of Top Management- Quality Council – Quality statements: vision, mission, Policy - SMART Goal setting -- Strategic Planning.

**TQM PRINCIPLES AND PHILOSOPHIES**

Customer satisfaction – Perception of Quality- Customer Complaints - Service Quality- Customer Retention- Employee Involvement – Motivation- Empowerment – Teams - Recognition and Reward- Performance Appraisal - Continuous Process Improvement : Deming's Philosophy - Juran's Trilogy - PDSA Cycle- Taguchi Quality Loss Function - 5S principles and 8D methodology - Kaizen - Basic Concepts.

**STATISTICAL PROCESS CONTROL (SPC) & PROCESS CAPABILITY**

Statistical Fundamentals – Measures of central Tendency & Dispersion - Population and Sample- Normal Curve- Control Charts for variables and attributes - OC curve - Process capability- Concept of six sigma- The Seven tools of Quality - New seven Management tools.

**TOOLS AND TECHNIQUES FOR QUALITY MANAGEMENT**

Bench marking – Reasons - Process- Quality Function Deployment (QFD) – House of Quality- QFD Process- Benefits- Total Productive Maintenance (TPM) – Concept- Improvement Needs- FMEA – Stages of FMEA - Business process re-engineering (BPR) – principles, applications, re engineering process, benefits and limitations.

**QUALITY SYSTEMS**

Introduction to IS/ISO 9004:2000 – quality management systems – Elements- Implementation of Quality System - Documentation- Quality Auditing- ISO 14000 – Concept- Requirements and Benefits.

**TEXT BOOKS:**


1. Dale H.Besterfiled- et at. - Total Quality Management- PHI-1999. (Indian reprint 2002).
2. Feigenbaum.A.V. "Total Quality Management- McGraw-Hill- 1991.


**REFERENCES:**


1. James R.Evans & William M.Lidsay - The Management and Control of Quality- (5th Edition) - South-Western (Thomson Learning) - 2002 (ISBN 0-324-06680-5).
2. Oakland.J.S. "Total Quality Management Butterworth – Hcinemann Ltd - Oxford. 1989.
3. Narayana V and Sreenivasan - N.S. Quality Management – Concepts and Tasks- New Age International 1996.


**COURSE DESIGNERS:**


| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| **1.** | A. Mani | Associate Professor | Management Studies | mani@vmkvec.edu.in |
| **2.** | Dr. V. Sheela Mary | Associate Professor | Management Studies | sheelamary@avit.ac.in |

| 34121H83 | UNIVERSAL HUMAN VALUES – UNDERSTANDING HARMONY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-HS | 3 | 0 | 0 | 3 |

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | Development of a holistic perspective based on self- exploration |
| **2.** | Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence |
| **3.** | Strengthening of self-reflection. |
| **4.** | Development of commitment and courage to act. |

**UNIT I Introduction**

Value Education, Definition, Concept and Need for Value Education-Content and Process of -basic guidelines for Value Education -Self exploration - Happiness and Prosperity as parts of Value Education.

**UNIT II Understanding Harmony in the Human Being**

Harmony in Myself-Understanding human being as a co-existence of the sentient 'I' and the material 'Body-Under standing the needs of Self ('I') and 'Body' - happiness and physical facility. -Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoy er)-Understanding the characteristics and activities of 'I' and harmony in 'I-Understanding the harmony of I with the Body-San yam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail

**UNIT III Understanding Harmony in the Family and Society**

Harmony in Human-Human Relationship -meaning of Justice - Trust and Respect -Difference between intention and competence- respect and differentiation; the other salient values in relationship 4.Understanding the harmony in the society - Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals –Gratitude

**UNIT IV Understanding Harmony in the Nature and Existence**

Whole existence as Coexistence -.Interconnectedness and mutual fulfillment among the four orders of nature-recyclability and self-regulation in nature-Holistic perception of harmony at all levels of existence. **Holistic Understanding of Harmony on Professional Ethics**

Natural acceptance of human values -.Definitiveness of Ethical Human Conduct - Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order- Competence in professional ethics

**UNIT V Gender Sensitization**

Introduction to Gender Sensitization- Sex Vs Gender- Social Construction of Gender- Gender Roles- Gender Stereotypes- Gender Division of Labour- Patriarchy- Masculinity- Ending violence against girls/women: Advance safety and rights- Gender Equality.

**TEXT BOOKS:**

1. Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010

**REFERENCES:**

1. James R.Evans & William M.Lidsay - The Management and Control of Quality- (5th Edition) - South-Western (Thomson Learning) - 2002 (ISBN 0-324-06680-5).
2. Oakland.J.S. "Total Quality Management Butterworth – Hcinemann Ltd - Oxford. 1989.
3. Narayana V and Sreenivasan - N.S. Quality Management – Concepts and Tasks- New Age International 1996

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| COURSE DESIGNERS | | | | |
|---|---|---|---|---|
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| 34121B01 | ENGINEERING MATHEMATICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 1 | 0 | 3 |

**PREAMBLE**

The driving force in Engineering Mathematics is the rapid growth of technology and the sciences. Matrices had been found to be of great utility in many branches of engineering applications such as theory of electric circuits, aerodynamics, and mechanics and so on. Many physical laws and relation can be expressed mathematically in the form of differential equations. Based on this we provide a course in matrices, calculus and differential equations. Vector calculus is a form of mathematics that is focused on the integration of vector fields. An Engineer should know the Transformations of the Integrals, as Transformation of Line Integral to surface and then to volume integrals.

**PREREQUISITE**

NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To recall the advanced matrix knowledge to Engineering problems. |
| **2.** | To equip themselves familiar with the functions of several variables. |
| **3.** | To improve their ability in solving geometrical applications of differential calculus problems |
| **4.** | To examine knowledge in multiple integrals. |
| **5.** | To improve their ability in Vector calculus. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.**Apply the concept of orthogonal reduction to diagonalise the given matrix | Apply |
| **CO2.**Find the radius of curvature, circle of curvature and centre of curvature for a given curve. | Apply |
| **CO3.** Classify the maxima and minima for a given function with several variables, through by finding stationary points | Apply |
| **CO4.** Find double integral over general areas and triple integral over general volumes | Apply |
| **CO5.** Apply Gauss Divergence theorem for evaluating the surface integral. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | -- | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO2 | S | S | M | -- | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO3 | S | S | M | -- | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO4 | S | S | M | -- | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO5 | S | S | M | -- | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**MATRICES:**
Characteristic equation– Eigen values and eigenvectors of a real matrix – Properties of eigenvalues and eigenvectors (Without proof) – Cayley-Hamilton theorem (excluding proof).

**DIFFERENTIAL CALCULUS&PARTIAL DERIVATIVES :**
Curvature – Cartesian and Parametric Co-ordinates – Centre and radius of curvature – Circle of curvature. Partial Derivatives – Total Differentiation – Maxima and Minima -Constrained Maxima and Minima by Lagrangian Multiplier Method,

**ORDINARY DIFFERENTIAL EQUATIONS:**
Solutions of second and third order linear ordinary differential equation with constant coefficients – Method of variation of parameters -Simultaneous first order linear equations with constant coefficients.

**MULTIPLE INTEGRALS:**
Introduction of multiple integration by examples of Double and Triple integral-Evaluation of double and Triple Integration(in both Cartesian and polar coordinates)-Change of order of integration.

**VECTOR CALCULUS:**
Scalar and vector point functions, Gradient, divergence, curl, Solenoidal and irrotational vectors, Vector identities (without proof),Normal and Directional derivatives, Solenoidal and irrotational field, Integration of vectors: Definition of Line, surface and volume integrals, Green's, Gauss divergence and Stoke's theorems (Statements only)

**TEXT BOOKS:**


1. Veerarajan T., "Engineering Mathematics", Tata McGraw Hill Education Pvt, New Delhi (2019).
2. Grewal B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi (2020).
3. Kreyszig E., "Advanced Engineering Mathematics", 8th Edition, John Wiley and Sons (Asia) Pvt. Ltd., Singapore (2012).


**REFERENCES:**


**1.** Engineering Mathematics", Department of Mathematics, VMKVEC (Salem) & AVIT (Chennai), (2017).
**2.** Dr.A.Singaravelu, "Engineering Mathematics I & II", 23rd Edition, Meenakshi Agency, Chennai (2016).


**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1. | Dr. A.K.Bhuvaneswari | Assistant Professor | Mathematics | bhuvaneswari@avit.ac.in |
| 2. | Dr.G.Selvam | Associate Professor | Mathematics | selvam@vmkvec.edu.in |

Dr. M. NITHYA,
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| 34121B20 | ADVANCED ENGINEERING MATHEMATICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 1 | 0 | 3 |

**PREAMBLE**

Impart knowledge about the subject of a single variable and multivariable, integral transformation with its application. The focus of the course will be the study of certain structures called Fourier series, Fourier Transform and Z Transform. Using the understanding of Integral transformation and applications to solve real world problems, it also provides the knowledge of Laplace Transforms and its application.

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Know how to derive a Fourier series of a given periodic function by evaluating Fourier coefficients |
| 2 | Fourier transforms has the wide application in the field of heat diffusion, wave propagation and in signal and systems analysis. |
| 3 | To learn about Z- transforms and its applications |
| 4 | To familiarize themselves with the Laplace transform |
| 5 | To learn inverse Laplace transform technique |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Find Fourier expansion of a given function | Apply |
| **CO2.** Solve Fourier integral problems | Apply |
| **CO3**. Analyzing discrete signals by using Z-transform | Apply |
| **CO4**. Apply Laplace transform technique to solve a periodic functions | Apply |
| **CO5**. Apply to solve differential equations by using inverse Laplace transform | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO2 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO3 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO4 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO5 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |

**S- Strong; M-Medium; L-Low**

**SYLLABUS**

**FOURIER SERIES:** Dirichlet's conditions - General Fourier series - Half-range Sine and Cosine series - Parseval's identity - Harmonic Analysis

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**FOURIER TRANSFORMS:** Fourier transform pairs - Fourier Sine and Cosine transforms – Properties - Transforms of simple functions - Convolution theorem - Parseval's identity

**Z – TRANSFORMS:** Z-Transform – Elementary Properties – Inverse Z-Transform – Convolution Theorem – Formation of Difference Equations – Solution of first and second order Difference Equations using Z-Transform

**LAPLACE TRANSFORMS: T**ransform of elementary functions – basic properties – derivatives and integrals of transforms – transforms of derivatives and integrals –Transform of periodic functions

**INVERSE LAPLACE TRANSFORM**

Inverse Laplace transform – Convolution theorem – Initial and Final value theorem-Solution of linear ODE of second order with constant coefficients and first order simultaneous equation with constant coefficients using Laplace transforms

**TEXT BOOKS:**


1. Grewal, B.S., "Higher Engineering Mathematics", 44th Edition, Khanna Publishers, Delhi (2017)
2. Kreyszig, E., "Advanced Engineering Mathematics", 10th Edition, John Wiley and Sons (Asia) Pvt Ltd., Singapore (2019).


**REFERENCES:**


1. Dr.A.Singaravelu, "Engineering Mathematics I & II", Meenakshi Agency, Chennai (2019)
2. Dr.A.Singaravelu , "Transforms and Partial differential Equations", Meenakshi Agency, Chennai (2019)
3. Veerarajan, T., "Engineering Mathematics I, II and III", Tata McGraw Hill Publishing Co., New Delhi (2012)
4. "Engineering Mathematics I & II ", by Department of Mathematics, VMKVEC (Salem) & AVIT (Chennai), (2017)


**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Mrs.V.T.Lakshmi | Associate Professor | Mathematics/VMKVEC | lakshmivt@vmkvec.edu.in |
| 2 | Dr. M.Thamizhsudar | Asst. Professor | Mathematics/AVIT | thamizhsudar@avit.ac.in |

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| 34121B17 | PROBABILITY AND QUEUEING THEORY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 1 | 0 | 3 |

**PREAMBLE**

Probabilistic and statistical analysis is mostly used in varied applications in Engineering and Science. Statistical method introduces students to cognitive learning in statistics and develops skills on analyzing the data by using different tests and designing the experiments with several factors. Queueing theory is the mathematical study of waiting lines and it's a primary tool for studying the problem of congestion.

**PREREQUISITE - Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To get the knowledge on concepts of random variables and distributions with respect to how they are applied to statistical data. |
| **2.** | To acquire skills in handling situations involving more than one random variable and functions of random variables. |
| **3.** | To be get exposed to the concepts of random processes and discrete time Markov chain. |
| **4.** | To acquire knowledge of Testing of Hypothesis useful in making decision and test them by means of the measurements made on the sample. |
| **5.** | To study queuing models for analyzing the real world systems. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Select an appropriate probability distribution to determine the probability function for solving engineering problem. | Understand |
| **CO2.** Derive the marginal and conditional distributions of bi-variate random variables, and use generating functions to establish the distribution of linear combinations of independent random variables. | Apply |
| **CO3.** Classify and apply the concepts of Random Process, Markov Process and their applications to answer quantitative questions about the outcomes of probabilistic systems | Apply |
| **CO4.** Apply the concepts of large/small sample tests into real life problems. | Apply |
| **CO5.** Derive and apply main formulas for some properties (such as stationary probabilities, average waiting and system time, expected number of customers in the queue, etc.) M/M/1, M/M/C – finite and infinite capacity queueing systems. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | -- | L | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO2 | S | M | L | -- | L | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO3 | S | M | L | -- | L | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO4 | S | S | M | M | L | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO5 | S | S | M | M | L | -- | -- | L | -- | -- | -- | M | -- | -- | -- |

**S- Strong; M-Medium; L-Low**

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**SYLLABUS**

**PROBABILITY AND RANDOM VARIABLES:**
Probability concepts - Random variables - Discrete and continuous random variables - Expectation - Variance - Moment Generating function, Standard Distributions**:** Binomial, Poisson, Normal, Uniform and Exponential

**TWO-DIMENSIONAL RANDOM VARIABLES:**
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Regression Analysis, Transformation of random variables, Central limit theorem.

**RANDOM PROCESSES:**
Classification, Stationary process, Markov process, Poisson process, Birth and death process, Renewal process, Markov chain, Transition probabilities, Limiting distributions.

**TESTING OF HYPOTHESIS:**
Sampling distributions – Statistical hypothesis – Testing of hypothesis for mean, variance, and proportions for large and Small Samples (Z, t and F test) - Chi-square Tests for Goodness of fit - independence of attributes.

**QUEUEING THEORY:**
Markovian queueing models, Little's formula, M/M/1, M/M/C – finite and infinite capacity - M/G/1 Queues, Pollaczek - Khintchine formula (Statement only)

**TEXT BOOKS:**


1. S.C. Gupta and V.K. Kapoor, "Fundamentals of Mathematical Statistics", 11th extensively revised edition, S. Chand & Sons (2015).
2. T. Veerarajan, "Probability, Statistics and Random processes" (Third Edition), Tata McGraw-Hill publishing Company Ltd., New Delhi (2017).
3. F.S Hillier and G.J. Lieberman, "Introduction to Operations Research: Concept and Cases", McGraw-Hill International (2012).


**REFERENCES:**


1. I.R. Miller, J.E. Freund and R. Johnson, " Probability and Statistics for Engineers", 8th Edition, (2015)
2. Dr.A.Singaravelu, "Probability and Queuing Theory", Meenakshi Agency, Chennai (2012).
3. Premkumar Gupta, D.S. Hira, "Operations Research", S.Chand & company New Delhi (2014).


**COURSE DESIGNERS**

| S. No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1. | Dr. P. Sasikala | Professor | Mathematics | sasikala@vmkvec.edu.in |
| 2. | Mr. D. Balaji | Asst. Professor | Mathematics | balaji@avit.ac.in |

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| 34121B36 | STATISTICAL FOUNDATION<br>(Statistical table permitted for Examination) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 1 | 0 | 3 |

**PREAMBLE**

Statistical methods are important tools which provide the engineers with both descriptive and analytical methods for dealing with the variability in observed data. It introduces students to cognitive learning in statistics and develops skills on analyzing the data by using different tests and methods.

**PREREQUISITE**

- **NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To describes the characteristic of the entire group of data and choose the best central tendency and variability statistic for different levels of measurement. |
| **2.** | To Understand the role of Sampling and steps in developing a sampling plan |
| **3.** | To acquire knowledge about important inferential aspects such as point estimation, test of hypotheses and associated concepts. |
| **4.** | Studying multiple partial correlations and fitting multiple linear regressions to trivariate data. |
| **5.** | Understand the theory of random number generators and the methods used in random variate generation |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Analyze statistical data using measures of central tendency, dispersion and location for grouped and un-grouped data cases. | Apply |
| **CO2.** Identify and recognize the appropriate sample survey design in real life related problems. | Apply |
| CO3. Estimate the characteristic of the population with degree of confidence from the random sample. | Apply |
| CO4. Apply the concept of linear correlation and regressions to engineering problems. Apply least square method in fitting linear and non linear regression curves. | Apply |
| **CO5.** Generate random numbers and random variates using different techniques. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | L | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO2 | S | S | M | L | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO3 | S | S | M | L | -- | -- | -- | L | -- | -- | -- | M | -- | -- | -- |
| CO4 | S | S | M | M | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO5 | S | S | M | M | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |

**S- Strong; M-Medium; L-Low**

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**SYLLABUS**

**EMPIRICAL STATISTICS**

Introduction to Statistics – Frequency distribution – Measures of Central tendency, dispersion, Skewness and Kurtosis.

**SAMPLING THEORY**

Fundamentals of sampling – Methods of Sampling – Random Sampling - Simple random Sampling – Restricted Random sampling - Non-Random Sampling – Judgment or Purposive Sampling – Quato sampling – Convenience Sampling – Mixed sampling

**ESTIMATION THEORY**

Sampling distributions – Estimation of parameters (consistent and unbiased) – Point and interval estimates for population proportions, mean and variance - Maximum likelihood estimate method - Method of moments

**LINEAR STATISTICAL MODELS**

Simple linear correlation and regression – Multiple and partial correlation and regression – Curve fitting by method of least squares – fitting of straight lines – polynomials – exponential curves.

**RANDOM NUMBER GENERATION**

Generation of random numbers, Techniques, tests for random numbers, Chi-square test, Runs test, Poker test, Kolmogrov Simrnov test, Random Variate generation – Inverse transform method, Exponential Random Variates, uniform random Variates, Poisson Random Variates, Binomial Random Variates, Normal Random Variates.

**TEXT BOOKS:**


1. S.P. Gupta, "Statistical Methods", Sultan Chand & Sons, New Delhi, 45th Revised Edition (2017).
2. Douglas C. Montgomery and George C.Runger, "Applied Statistics and Probability for Engineers", 6th Edition, Wiley (2013).
3. Jerry Banks, John S. Carson, Barry L. Nelson, David M.Nicol, "Discrete – Event System Simulation", Prentice Hall of India, Delhi (2002).


**REFERENCES:**


1. S.C.Gupta and V.K.Kapoor, "Fundamentals of Mathematical Statistics", Sultan Chand & Sons, New Delhi (2015).
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition (2007).
3. Geoffrey Gordon, "System Simulation", Prentice Hall of India, Delhi (2002).


**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr.P.Sasikala | Professor | Mathematics | sasikala@vmkvec.edu.in |
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| 34121B21 | DISCRETE MATHEMATICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 1 | 0 | 3 |

**PREAMBLE**

Discrete mathematics is very useful in constructing computer programs and in mastering many theoretical topics of computer science. It works with discrete structures, which are the abstract mathematical structures used to represent discrete objects and relationships between these objects. It is used to design efficient networks, optimally assign frequencies to cellular phones, efficiently schedule large projects, plan optimal routes, and solve many other problems, both applied and abstract.

**PREREQUISITE - Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To extend student's logical and mathematical maturity and ability to deal with abstraction |
| **2.** | Students will be able to Formulate statements from common language to formal logic, apply truth tables and the rules of propositional and predicate calculus |
| **3.** | To understand the basic concepts of combinatorics |
| **4.** | To familiarize the applications of algebraic structures |
| **5.** | To understand the concepts and significance of lattices and Boolean algebra which are widely used in computer science and engineering |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Rephrase real world statements as logical propositions and demonstrate whether the proposition is satisfiable, tautology or a contradiction | Apply |
| **CO2**. Infer whether a logical argument is valid from the given set of premises by applying the inference rules of predicate calculus. | Apply |
| **CO3.** Construct the recurrence relation for a given engineering problem and solve the recurrence equation | Apply |
| **CO4**. Be exposed to concepts and properties of algebraic structures such as groups, rings and Fields. | Apply |
| **CO5**. To be familiar with the notions of ordered algebraic structures, including lattices and Boolean algebras | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO2 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO3 | S | S | M | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO4 | S | S | S | L | -- | -- | -- | M | -- | -- | -- | M | -- | -- | -- |
| CO5 | S | S | M | M | L | -- | -- | M | -- | -- | -- | M | -- | -- | -- |

**S- Strong; M-Medium; L-Low**

**SYLLABUS**

**PROPOSITIONAL CALCULUS**

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan's Laws - Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.



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**PREDICATE CALCULUS**

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

**COMBINATORICS**

Review of Permutation and combination-Mathematical Induction-Pigeon hole principle-Principle of inclusion and exclusion-Generating function-Recurrence relations.

**GROUPS**

Semi groups-Monoids-groups-permutation group –Cosets-Lagrange's theorem-Group homomorphism-Kernal-Rings and Fields (definitions and Examples only).

**LATTICES**

Partial ordering- Posets-Hasse diagram-Lattices-Properties of Lattices-Sub Lattices- Distributed Lattices -Special Lattices-Boolean Algebra-Homomorphism

**TEXT BOOKS:**


1. Tremblay J.P, and Manohar R., "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill Book Company (1975), International Edition (1987).
2. Rosen, K.H., "Discrete Mathematics and its Applications", 7th Edition, Tata McGraw Hill Pub. Co. Ltd., New Delhi, Special Indian Edition (2011).


**REFERENCES:**


1. Dr.A.Singaravelu, "Discrete Mathematics", Meenakshi Publishers, Chennai (2019).
2. K.Sankar , "Discrete Mathematic", 3rd edition, Indian Publishers, Chennai.(2016)


**COURSE DESIGNERS**


| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr. S.Punitha | Associate Professor | Mathematics | punithas@vmkvec.edu.in |
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| 34121B04 | PHYSICAL SCIENCES - Part A: ENGINEERING PHYSICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 0 | 0 | 2 |

**PREAMBLE**

Engineering Physics is the study of advanced physics concepts and their applications in various technological and engineering domains. Understanding the concepts of laser, types of lasers, the propagation of light through fibers, applications of optical fibers in communication, production and applications of ultrasonics will help an engineer to analyze, design and to fabricate various conceptual based devices.

**PREREQUISITE : NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To recall the properties of laser and to explain principles of laser |
| **2.** | To assess the applications of laser |
| **3.** | To detail the principles of fiber optics |
| **4.** | To study the applications of fiber optics |
| **5.** | To explain various techniques used in Non-destructive testing |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Understand the principles laser, fiber optics and ultrasonic | Understand |
| **CO2.** Understand the construction of laser, fiber optic and ultrasonic equipments | Understand |
| **CO3.** Demonstrate the working of laser, fiber optic and ultrasonic based components and devices | Apply |
| **CO4.** Interpret the potential applications of laser, fiber optics and ultrasonics in various fields | Apply |
| **CO5.** Differentiate the working modes of various types of laser, fiber optic and ultrasonic devices. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | - | M | - | - | - | - | - | - | - | - | M | M | - | M |
| CO2 | S | - | L | - | - | - | - | - | - | - | - | M | M | - | - |
| CO3 | S | - | - | M | - | - | M | - | - | - | - | M | M | - | - |
| CO4 | S | M | - | M | M | S | M | - | - | - | - | M | S | - | M |
| CO5 | S | M | M | - | - | - | - | - | - | - | - | M | M | - | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**Unit: I**

**LASERS:** Laser characteristics - Stimulated Emission – Population Inversion - Einstein coefficients – Lasing action – Types of Laser – Nd:YAG laser, CO2 laser, GaAs laser – Applications of Laser – Holography – construction and reconstruction of a hologram.

**Unit: II**

**FIBRE OPTICS:** Principle and propagation of light in optical fibers – numerical aperture and acceptance angle – types of optical fibers (material, refractive index, mode) – Applications: Fiber optic communication system – fiber optic displacement sensor and pressure sensor.

**Unit: III**

**ULTRASONICS:** Ultrasonic production: Magnetostriction and piezo electric methods – Determination of velocity of ultrasonic waves (acoustic grating) – Applications of ultrasonics

**TEXT BOOKS**

1. Engineering Physics, compiled by Department of Physics, Vinayaka Mission's Research Foundation (Deemed to be University), Salem.

2. Palanisamy P. K., Engineering Physics, Scientific Publishers, 2011.

3. Avadhanulu M. N., Kshirsagar P. G., Arun Murthy T. V. S., A Textbook of Engineering Physics, S. Chand Publishing, 2018.

**REFERENCE BOOKS**

1. Beiser, Arthur, Concepts of Modern Physics, 5th Edition, McGraw-Hill, 2009.

2. Halliday.D, Resnick.R, Walker.J, Fundamentals of Physics, Wiley & sons, 2013.

3. Gaur R. K. and Gupta S. L., Engineering Physics, DhanpatRai publishers, New Delhi, 2012.

4. Srivastava S. K., Laser Systems and Applications 3rd Edition, New Age International (P) Ltd Publishers, 2019.

5. Ajoy Ghatak, Thyagarajan K., Introduction To Fiber Optics, Cambridge India, 2013.

**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| **2.** | Dr. R. SETHUPATHI | ASSOCIATE PROFESSSOR | PHYSICS | sethupathi@vmkvec.edu.in |

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| 34121B04 | PHYSICAL SCIENCES<br>PART-B - ENGINEERING CHEMISTRY<br>( Common to all Branches) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 2 | 0 | 0 | 2 |

**PREAMBLE**

The objective of this course is to better understand the basic concepts of chemistry and its applications in diverse engineering domains. It also imparts knowledge on the properties of water and its treatment methods, Electrochemistry, corrosion and batteries, properties of fuel and combustion. This course also provides an idea to select the material for various engineering applications and their characterization.

**PREREQUISITE**

**NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To Provide the knowledge on water treatment. |
| **2.** | To explain about the importance of electrochemistry, mechanism of different corrosion and principle and working of batteries. |
| **3.** | To explain different types of fuel, properties and its important features. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to understand

| | | |
|---|---|---|
| **CO1.** | Estimate the hardness of water Apply and Identify suitable water treatment methods. | Apply |
| **CO2.** | Describe terms involved in electrochemistry, the control methods of corrosion and working of energy storage devices. | Analyse |
| **CO3.** | Understand the quality of fuels from its properties and the important features of fuels | Analyse |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOME**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO 11 | PO12 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO 1 | S | M | M | L | - | M | S | M | - | - | - | M | M | M | M |
| CO 2 | S | S | L | L | - | S | S | S | - | - | - | S | M | L | M |
| CO 3 | S | M | M | L | L | L | M | M | - | - | - | S | - | M | M |

**S- Strong; M-Medium; L-Low**

## Syllabus

**UNIT – I: WATER TECHNOLOGY**

Hardness of water – types – expression of hardness – units – estimation of hardness of water by EDTA. Boiler troubles - Treatment of boiler feed water – Internal treatment (phosphate, colloidal, sodium aluminate and calgon conditioning). External treatment – Ion exchange process, zeolite process – Domestic water treatment - desalination of brackish water – Reverse Osmosis and Electrodialysis.

**UNIT – II: ELECTROCHEMISTRY, CORROSION AND BATTERIES**

Electrochemistry: Electrode potential - Nernst equation – Electrodes (SHE, Calomel and Glass) - Galvanic cell- Electrochemical cell representation - EMF series and its significance. Corrosion – Definition causes and effects, Classification, Types of corrosion- dry corrosion, Wet corrosion, Factors influencing rate of corrosion, Corrosion control methods – Sacrificial anode method and impressed

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current cathodic method. Batteries: Terminology- Daniel cell – Dry cell - Lead-acid accumulator- Nickel-Cadmium batteries, Lithium batteries: Li/SOCl2 cell - Li/I2 cell- Lithium ion batteries. Fuel cells: Hydrogen-oxygen fuel cell, Solid oxide fuel cell (SOFC)

**UNIT – III FUELS AND COMBUSTION**

Fuels: Introduction – classification of fuels – coal – analysis of coal (proximate and ultimate). Carbonization – manufacture of metallurgical coke (Otto Hoffmann method) – petroleum – manufacture of synthetic petrol (Bergius process). Knocking – octane number – cetane number – natural gas – compressed natural gas (CNG). Liquefied petroleum gases (LPG) – power alcohol and biodiesel. Combustion of fuels: Introduction – calorific value – higher and lower calorific values- theoretical calculation of calorific value – ignition temperature – spontaneous ignition temperature – explosive range – flue gas analysis (ORSAT Method).

**TEXTBOOK**


1. Engineering Chemistry by Jain and Jain, 16th Edition, Dhanpat Rai Publishing Company, New Delhi, 2017
2. A text book of Engineering Chemistry by S.S. Dara, S.Chand & company Ltd., New Delhi
3. A text book of Engineering Chemistry by Shashi Chawla, Edition 2012 Dhanpatrai & Co., New Delhi.


**REFERENCES**


1. Chemistry: Principles and Applications, by M. J. Sienko and R. A. Plane, 3rd Edition, McGraw Hill, 1980
2. Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan
3. Physical Chemistry, by P. W. Atkins, Julio de Paula, 8th Edition, Oxford University press, 2007
4. Engineering Chemistry by Dr. A. Ravikrishnan, Sri Krishna Publications, Chennai.


**Course Designers:**


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|---|---|---|
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| 34121B05 | SMART MATERIALS AND NANOTECHNOLOGY | Category | L | T | P | C |
|---|---|---|---|---|---|---|
| | Total Contact Hours: 45 | FC-BS | 3 | 0 | 0 | 3 |
| | Prerequisite: Physical Sciences – Engineering Physics | | | | | |

**Preamble:**

This syllabus enables the students to learn the applications of smart materials and uses of various smart engineering devices. The syllabus also discusses about the nano materials, their unique properties and applications in various fields.

**Course Objectives:**

| | |
|---|---|
| **1.** | Gain the knowledge about the concepts of smart systems and various smart materials. |
| **2.** | Realize about the smart sensor materials which are used for Industrial Applications. |
| **3.** | Understand about the Industrial application oriented Smart materials'Actuators. |
| **4.** | To learn the properties and classifications and importance of Nano materials |
| **5.** | Understand the characteristic features of materials at nano scale and their potential applications |

| | | |
|---|---|---|
| **COS** | **Course Outcomes:** On the successful completion of the course, students will | |
| **CO1** | Learn the smart-properties of various functional materials | Learn |
| **CO2** | understand the applications of different smart materials as sensors | Understand |
| **CO3** | understand the applications of different smart materials as actuators | Understand |
| **CO4** | Gather knowledge on unique properties of nano materials | Learn |
| **CO5** | Use of Nano materials for industrial applications | Acquire |
| **CO6** | Gain knowledge about nano materials in health care industry | |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| **CO2** | S | S | S | S | M | - | - | - | - | - | - | S | - | - | |
| **CO3** | S | M | S | S | - | - | - | - | - | - | - | S | - | - | - |
| **CO4** | S | S | S | S | M | - | - | - | - | - | - | S | - | - | - |
| **CO5** | S | S | S | S | - | - | - | - | - | - | - | S | - | - | - |
| **CO6** | S | M | M | S | M | - | - | - | - | - | - | S | - | - | - |

S – strong, M- Medium, L - Low

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| Syllabus |
|---|
| **Overview of Smart Materials:** Introduction to Smart materials –piezoelectric materials – piezoelectric – electromagnetic materials – electromagnetic effect– shape memory alloys (SMA) – photo elastic materials – photo elasticity. |
| **Smart material based sensors:** Introduction to sensing technology - electric and magnetosrictive sensors - SMA based sensors - Infrared sensors – stress analysis by photo elastic sensors- Industrial Applications of smart sensors: Accelerometer and Biological DNA sensors. |
| **Smart Materials For Actuators:** Introduction to smart actuators - piezoelectric actuators - magnetostrictive actuators - SMA based actuators - polymeric and carbon nanotubes based low power actuators –Industrial Applications: robotic artificial muscles , materials for bone substitutes and tissue replacement implants - smart polymeric materials for skin engineering |
| **Materials in Nanoscale:** Historical development of nanomaterials - Unit and dimensions - Classifications of nanomaterials - quantum dots, nanowires, ultra-thin films, nano particles, multilayered materials. Length Scales involved and effect on properties: mechanical, electronic, optical, magnetic and thermal properties. |
| **Selected Applications of Nanomaterials:** Medical diagnostics – nanomedicine – targeted drug delivery – Biosensors; Information storage – nanocomputer – molecular switch – single electron transistors; design and fabrication of MEMS and NEMS devices. |
| **TEXT BOOKS** |
| 1. Palanisamy P.K. Materials Science. SCITECH Publishers, 2015.<br>2. Fundamental of Smart Materials, Editor: Mohsen Shahinpoor, RSC Publishers 2020<br>3. Charles P. Poole, Jr. and Frank J Ownes, "Introduction to Nanoscience and Nanotechnology", Wiley-Interscience Inc., Publication, 1st Edition, 2020.<br>4. Smart Material Systems And Mems Design And Development Methodologies by Vijay K Varadan, WILEY INDIA 2014. |
| **REFERENCE BOOKS** |
| 1. Pillai S.O., Solid State Physics, 9th Edition, New Age International (P) Ltd., Publishers, 2020.<br>2. William D. Callister Jr., David G. Rethwisch., Materials Science and Engineering: An Introduction, 10th Edition, Wiley Publisher, 2018.<br>3. Nanotechnology, Second eition, M. A. Shah and K. A. Shah, Wiley Publishers 2019.<br>4. Fundamentals of Nanotechnology, Hornyak, G. Louis, Tibbals, H. F., Dutta, Joydeep, CRC Press, 2009. |

**COURSE DESIGNERS**

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| 34121B81 | PHYSICAL SCIENCES LAB: PART A – REAL AND VIRTUAL LAB IN PHYSICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 0 | 0 | 2 | 1 |

**PREAMBLE**

In this laboratory, experiments are based on the calculation of physical parameters like young's modulus, rigidity modulus, viscosity of water, wavelength of spectral lines, thermal conductivity and band gap. Some of the experiments involve the determination of the dimension of objects like the size of a microparticle and thickness of a thin wire. In addition to the above real lab experiments, students gain hands-on experience in virtual laboratory.

**PREREQUISITE NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To impart basic skills in taking reading with precision of physics experiments |
| 2 | To inculcate the habit of handling equipments appropriately |
| 3 | To gain the knowledge of practicing experiments through virtual laboratory. |
| 4 | To know the importance of units |
| 5 | To obtain results with accuracy |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Recognize the importance of units while performing the experiments, calculating the physical parameters and obtaining results | Understand |
| CO2. Operate the equipment's with precision | Apply |
| CO3. Practice to handle the equipment's in a systematic manner | Apply |
| CO4. Demonstrate the experiments through virtual laboratory | Apply |
| CO5. Calculate the result with accuracy | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO2 | S | S | M | M | S | - | - | - | M | - | - | M | M | - | M |
| CO3 | S | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO4 | S | S | M | M | S | - | - | - | - | - | - | S | M | - | M |
| CO5 | S | S | - | - | - | - | - | - | - | - | - | - | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

1. Young's modulus of a bar - Non-uniform bending
2. Rigidity modulus of a wire - Torsional Pendulum
3. Viscosity of a liquid - Poiseuille's method
4. Velocity of ultrasonic waves in liquids - Ultrasonic Interferometer
5. Particle size determination using Laser
6. Wavelength of spectral lines – grating – Spectrometer

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7. Thickness of a wire - Air wedge Method
8. Thermal conductivity of a bad conductor - Lee's disc
9. Band gap determination of a thermistor - Post Office Box
10. Specific resistance of a wire – Potentiometer

**LAB MANUAL**

Physical Sciences Lab: Part A – Real And Virtual Lab In Physics Manual compiled by Department of Physics, Vinayaka Mission's Research Foundation (Deemed to be University), Salem.

**COURSE DESIGNERS**

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| 34121B81 | PHYSICAL SCIENCES<br>PART B - ENGINEERING CHEMISTRY LAB<br>(Common to All Branches) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 0 | 0 | 2 | 1 |

Engineering Chemistry Lab experiments explains the basics and essentials of Engineering Chemistry. It also helps the students to understand the applications of Engineering Chemistry. The electrodes, Cell and batteries study gives clear basic application oriented knowledge about electrochemistry. Water technology study gives the idea about hardness and its disadvantages. Now-a-days the practical and handling of equipments are needed for our fast growing life style.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To impart basic skills in Chemistry so that the student will understand the engineering concept. |
| **2.** | To inculcate the knowledge of water and electrochemistry. |
| **3.** | To lay foundation for practical applications of chemistry in engineering aspects. |

**C.OURSE OUTCOMES**

On the successful completion of the course, students will be able to

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| | |
|---|---|
| CO1. Understand the basic skills for his/her future studies. | Understand |
| CO2 Analyze the water comprehensively. | Apply |
| CO3. Apply the practical knowledge in engineering aspects | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | - | L | M | M | S | - | - | - | M | - | - | - |
| CO2 | S | M | M | - | L | M | M | L | - | - | - | M | - | - | - |
| CO3 | S | S | M | - | L | M | M | M | - | - | - | M | | | |

S- Strong; M-Medium; L-Low

1. Determination of Hardness by EDTA method
2. Estimation of Hydrochloric acid by conductometric method
3. Acid Base titration by pH method
4. Estimation of Ferrous ion by Potentiometric method
5. Determination of Dissolved oxygen by Winkler's method
6. Estimation of Sodium by Flame photometer
7. Estimation of Copper from Copper Ore Solution
8.Estimation of Iron by Spectrophotometer

**TEXT BOOK:**

1. Engineering Chemistry Lab Manual by VMU.

**COURSE DESIGNERS**

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| 34121B19 | ENVIRONMENTAL SCIENCES (Common to All Branches) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-BS | 3 | 0 | 0 | 3 |

**Environmental science** is an inter disciplinary field that integrates physical, chemical, biological, and atmospheric sciences. Environmental studies deals with the human relations to the environment and societal problems and conserving the environment for the future. Environmental engineering focuses on the various issues of environment and its management for sustainable development by improving the environmental quality in every aspect.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To inculcate the knowledge of significance of environmental studies and conservation of the natural resources. |
| 2 | To acquire knowledge of ecosystem, biodiversity, it's threats and the need for conservation. |

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| | |
|---|---|
| 3 | To gain knowledge about environmental pollution, it's sources, effects and control measures |
| 4 | To familiarize the legal provisions and the national and international concern for the protection of environment |
| 5 | To be aware of the population on human health and environment, role of technology in monitoring human health and environment. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Understand the importance of environment and alternate energy resources | Understand |
| CO2. Initiate the awareness and recognize the social responsibility in ecosystem and biodiversity conservation | Apply |
| CO3. Develop technologies to analyse the air, water and soil pollution and solve the problems | Apply |
| CO4. Evaluate the social issues and apply suitable environmental regulations for a sustainable development | Evaluate |
| CO5. Identify and analyse the urban problems, population on human health and environment | Analyse |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | - | S | S | S | - | - | - | S | - | - | - |
| CO2 | S | M | M | - | - | S | S | S | - | - | - | S | - | - | - |
| CO3 | S | L | M | - | - | S | S | S | - | - | - | S | - | - | - |
| CO4 | S | S | S | L | - | S | S | S | - | - | - | S | - | - | - |
| CO5 | S | S | S | M | - | S | S | S | - | - | - | S | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**UNIT –I ENVIRONMENT AND NATURAL RESOURCES** **6 hrs**

Environment - Definition, scope & importance - Public awareness- Forest resources- Use and over-exploitation, deforestation, case studies- Water resources: Use and over-utilization of surface and ground water, dams-benefits and problems –Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, Agriculture- effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Renewable and non renewable energy sources, use of alternate energy sources, Scope & role of engineers in conservation of natural resources.

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**UNIT –II ECOSYSTEMS AND BIO – DIVERSITY** **6 hrs**

Ecosystem - Definition, structure and function - Food chain, food web, ecological pyramids- Introduction, types, characteristics, structure and function of forest and Aquatic ecosystems – pond and sea, Introduction to biodiversity, Levels of biodiversity: genetic, species and ecosystem diversity – Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values –India as a mega-diversity nation – hot-spots of biodiversity –Threats to biodiversity: Habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – Conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

**UNIT –III ENVIRONMENTAL POLLUTION** **6 hrs**

Pollution - Definition, causes, effects and control measures of Air, Water and Land pollution, Solid waste- solid waste Management,–Disaster management: Floods, earthquake, cyclone, landslides and tsunamis - Clean technology options, Low Carbon Life Style.

**UNIT-IV SOCIAL ISSUES AND ENVIRONMENT** **6 hrs**

Sustainable Development- Water conservation – rain water harvesting, watershed management -Resettlement and rehabilitation of people , case studies –Climate change - Global warming - Acid rain - Ozone depletion- Environment Protection Act – Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act- Pollution Control Board-central and state pollution control boards.

**UNIT-V HUMAN POPULATION AND ENVIRONMENT** **6 hrs**

Population – Population growth & Population Explosion –Family welfare programme - Environment & human health - Human rights – Value education –AIDS/HIV, Role of information technology in environment and human health.

**TEXT BOOK**


1. Environmental Science and Engineering by Dr.A. Ravikrishnan, Sri Krishna Publications, Chennai.
2. Erach Bharucha "The Biodiversity of India" Mapin Publishing Pvt Ltd, Ahmedabad, India
3. Benny Joseph “Environmental Science and Engineering”, Tata Mc Graw- Hill, New Delhi


**REFERENCES:**


1. Wager K.D. "Environmental Management", W.B. Saunders Co. Philadelphia, USA, 1998.
2. Anubha Kaushik and C.P Kaushik “Perspectives of Environmental Studies”, New age international publishers.
3. Trivedi R.K. “Handbook of Environmental Laws", Rules, Guidelines,Compliances and Standards Vol I & II, Enviromedia.
4. Environmental Science and Engineering by Dr. J. Meenambal, MJP Publication, Chennai Gilbert M. Masters: Introduction to Environmental Engineering and Science , Pearson EducationPvtLtd., II Edition, ISBN 81-297-0277-0,2004.
5. Miller T.G.Jr. Environmental Science Wads worth Publishing. Co.
6. Townsend C. Harper J. and Michael Begon, Essentials of Ecology, Blackwell Science.


**COURSE DESIGNERS**

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|---|---|---|
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| 35021E01 | FOUNDATIONS OF COMPUTING AND PROGRAMMING (THEORY AND PRACTICALS) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 2 | 0 | 2 | 3 |

**PREAMBLE**

This course aims to provide the fundamental concepts of Computer operations like hardware and software, emphasizing principles programming languages. Studying the fundamentals database languages, commands and internet basics.

**PRERQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To provide basic knowledge of hardware components of computers and classifications. |
| **2.** | To introduce and demonstrate various Software application packages. |
| **3.** | To study Principles of programming and applications of programming. |
| **4.** | To learn Operating system and Database Management Systems language & commands used. |
| **5.** | To learn basics of Internet and Web services. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. To understand the Basic knowledge on computer hardware and its functions. | Understand |
| CO2. To get knowledge of Fundamentals of Application Softwares | Understand |
| CO3.To Understand the principles of programming and categories of programming languages. | Apply |
| CO4.To understand the fundamentals of operating systems and Database Management Systems languages and their classifications. | Apply |
| CO5.To understands and demonstrates the Internet Basics. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | - | - | - | - | - | - | - | - | - | - | - | S | M | - |
| CO2 | S | M | M | - | M | - | - | - | - | - | - | M | S | M | M |
| CO3 | S | S | S | - | M | - | - | - | - | - | - | - | S | - | M |
| CO4 | S | S | S | - | S | - | - | - | - | - | - | - | S | M | M |
| CO5 | S | M | M | - | M | - | - | - | - | - | - | S | S | M | M |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**Introduction to computers:**

Computer – Characteristics of computers -Generations of computers- Types of Computers- Block diagram of a computer – Components of a computer system –Hardware and software definitions – Categories of software – Booting.

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**Application Softwares:**
Office Automation: Application Packages – Word processing (MS Word) – Spread sheet (MS Excel) – Presentation (MS PowerPoint).
Lab Component-Ms Word,,Ms Excel,Ms power point.

**Introduction to programming**
Problems Solving Techniques - Program Development Cycle – Algorithm Development – Flow chart generation –Programming Constructs (Sequential, Decision-Making, Iteration) – Types and generation of programming Languages**.**

**Fundamentals of Operating System and DBMS :**
Operating Systems: Introduction, Functions of an operating System, types of Operating Systems
Introduction to Database Management Systems- -File system vs DBMS, Database applications, Database users, Introduction to SQL, Classification of SQL:DDL, DML, DCL, TCL
Lab Component- DDL, DML, DCL, TCL constraints

**Internet Basics**
Introduction, Features of Internet, Internet application, Services of Internet
Basics of HTML – Applications of HTML – HTML Fonts – anchor tag and its attributes – Using images in HTML programs – list tag - Table tag .

**Lab Component -HTML programs**
**TEXT BOOKS:**


1. "Essentials of Computer Science and Engineering", Department of Computer Sciences, VMKVEC, Salem, Anuradha Publishers, 2017.
2. J. Glenn Brookshear,"Computer Science: An Overview", Addision-Wesley, Twelfth Edition, 2014


**REFERENCES:**


1. "Concepts of programming language" Concepts of Programming Languages Eleventh Edition GLOBAL Edition Robert W. Sebesta, 2019.

Knuth D.E., "The Art of computer programming Vol 1: Fundamental Algorithms", 3rd Edition, Addison Wesley, 2011


**COURSE DESIGNERS**

| S. No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| 34621E01 | BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING<br>A. BASIC ELECTRICAL ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 2 | 0 | 0 | 2 |

**PREAMBLE**

It is a preliminary course which highlights the basic concepts and outline of Electrical engineering. The concepts discussed herein are projected to deliver explanation on basic electrical engineering for beginners of all engineering graduates.

**PREREQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To explain the basic laws used in Electrical circuits and various types of measuring instruments. |
| 2 | To explain the different components and function of electrical dc and ac machines. |
| 3 | To understand the fundamentals of safety procedures, Earthing and Power system. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Explain the electrical quantities and basic laws of electrical engineering. | Remember |
| CO2: Demonstrate Ohm's and Faraday's Law. | Apply |
| CO3: Describe the basic concepts of measuring instruments. | Understand |
| CO4: Explain the operation of electrical machinaries and its applications. | Understand |
| CO5: Explain the electrical safety and protective devices. | Understand |
| CO6: Compare the various types electrical power generation systems by application of conventional and non-conventional sources. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | - | - | M | L | - | - | - | L | M | L | S | M | L |
| CO2 | S | M | M | L | M | - | - | - | S | M | M | L | S | L | - |
| CO3 | S | M | M | M | M | - | - | - | - | L | M | L | S | M | L |
| CO4 | S | M | L | L | M | L | - | - | - | L | M | L | S | L | - |
| CO5 | S | M | L | - | M | S | - | - | - | L | L | L | - | - | - |
| CO6 | S | M | - | - | M | L | S | L | - | L | L | L | M | L | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**ELECTRICAL CIRCUITS AND MEASUREMENTS**

Electrical quantities - Charge, Electric potential, current, power and Energy, Passive components (RLC)- Fundamental laws of electric circuits-steady solution of DC circuits - Introduction to AC circuits- Sinusoidal steady state analysis-Power and Power factor – Single phase and Three phase balanced circuits - Classification of Instruments-Operating Principles of indicating instruments.

**ELECTRICAL MACHINES**

Faraday's Law, Construction, Principle of operation, Basic Equation and Applications of DC & AC Generators and Motors - Single Phase Transformer, Single phase and Three phases Induction Motor.

**ELECTRICAL SAFETY AND INTRODUCTION TO POWER SYSTEM**

Protection & Safety - Hazards of electricity - shock, burns, arc-blast, Thermal Radiation, explosions, fires, and effects of electricity on the human body. Electrical safety practices, Protection devices.

Types of Generating stations, Transmission types & Distribution system (levels of voltage and power ratings)- Simple layout of generation, transmission and distribution of power.

**TEXT BOOKS:**


1. Metha.V.K, Rohit Metha, "Basic Electrical Engineering", Fifth Edition, Chand. S&Co, 2012.
2. Kothari.D.P and Nagrath.I. J, "Basic Electrical Engineering", Second Edition, Tata McGraw-Hill, 2009.
3. R.K.Rajput , "Basic Electrical and Electronics Engineering", Second Edition, Laxmi Publication, 2012.


**REFERENCE BOOKS:**


1. Smarajt Ghosh, "Fundamentals of Electrical &Electronics Engineering", Second Edition, PHI Learning, 2007.


**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr. R. Devarajan | Professor | EEE/VMKVEC | devarajan@vmkvec.edu.in |
| 2 | Dr. G.Ramakrishnaprabu | Associate Professor | EEE/VMKVEC | ramakrishnaprabu@vmkvec.edu.in |
| 3 | Ms. D. Saranya | Assistant Professor (Gr-II) | EEE/AVIT | dsaranya@avit.ac.in |
| 4 | Mr. S. Prakash | Assistant Professor (Gr-II) | EEE/AVIT | sprakash@avit.ac.in |

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| 34621E01 | BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING<br>B. BASIC ELECTRONICS ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 2 | 0 | 0 | 2 |

**PREAMBLE**

The course aims to impart fundamental knowledge on electronics components, digital logics and communication engineering concepts. The course begins with classification of various active and passive components, diodes and transistors. It enables the student to design small digital logics like multiplexer, de-multiplexer, encoder, decoder circuits, etc. It crafts the students to get expertise in modern communication systems.

**PRERQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn and identify various active and passive components and their working principles. |
| 2 | To understand the number conversion systems and working Principles of logic gates. |
| 3 | To learn the digital logic principles and realize adders, multiplexer, etc., |
| 4 | To understand the application-oriented concepts in the Various communication systems. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Interpret working principle and application of various active and passive electronic components like resistors, capacitors, inductors, diodes and transistors. | Understand |
| CO2. Construct the rectifier, Clipper, Clamper, regulator circuits and explore their operations. | Apply |
| CO3. Execute number system conversions and compute several digital logic operations. | Apply |
| CO4. Design adders, Multiplexer, De-Multiplexer, Encoder, Decoder circuits for given data input. | Apply |
| CO5. Expose the working principles of modern technologies in developing application-oriented gadgets like the UHD, OLED, HDR and various communication systems. | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | - | - | - | - | - | - | L | - | - | - | M | - | - |
| CO2 | S | M | M | M | - | - | M | - | L | - | - | L | - | M | - |
| CO3 | S | M | M | - | - | - | - | - | L | - | - | - | S | - | - |
| CO4 | S | M | M | M | - | - | M | - | L | - | - | L | M | - | - |
| CO5 | S | M | - | - | - | - | - | - | L | L | - | L | S | - | L |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**SEMICONDUCTOR DEVICES**

Passive and Active Components - Resistors, Inductors, Capacitors- Intrinsic Semiconductor, Extrinsic Semiconductor, Energy band diagram- Conductor, insulator, semiconductor, Characteristics of PN Junction Diode - Zener Diode and its Characteristics - Half wave and Full wave Rectifiers, Voltage Regulation- Simple wave shaping circuits- Clipper, Clamper. Bipolar Junction Transistor, JFET, MOSFET & UJT.

**DIGITAL FUNDAMENTALS**

Number Systems – Binary, Octal, Decimal and Hexa-Decimal – Gray Code- Conversion from one to another – Logic Gates and its characteristics – AND, OR, NOT, XOR, Universal Gates – Adders, Multiplexer, De Multiplexer, Encoder, Decoder – Memories.

**COMMUNICATION AND ADVANCED GADGETS**

Modulation and Demodulation – AM, FM, PM ,PCM,DM– RADAR – Satellite Communication – Mobile Communication, Optical communication, Microwave communication. LED, HD, UHD, OLED, HDR & Beyond, Smart Phones – Block diagrams Only.

**TEXT BOOKS:**


1. R.K. Rajput, "Basic Electrical and Electronics Engineering", Laxmi Publications, Second Edition, 2012.
2. Dr.P.Selvam, Dr.R.Devarajan, Dr.A.Nagappan, Dr.T.Muthumanickam and Dr.T.Sheela,"Basic Electrical and Electronics Engineering", Department of EEE & ECE, Faculty of Engineering & Technology, VMRFDU, Anuradha Agencies, 2018.
3. Edward Hughes, "Electrical and Electronics Technology", Pearson Education Limited, Ninth Edition, 2005.


**REFERENCES:**


1. John Kennedy, "Electronics Communication System", Tata McGraw Hill, 2003.


**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| 3 | Mr.R.Karthikeyan | Assistant Professor (Gr-II) | ECE | rrmdkarthikeyan@avit.ac.in |
| 4 | Ms.R.Mohana Priya | Assistant Professor (Gr-II) | ECE | mohanapriya@avit.ac.in |

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| 35021E02 | PYTHON PROGRAMMING (THEORY AND PRACTICALS) | CATEGORY | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| | | FC-ES | 2 | 0 | 2 | 3 |

**PREAMBLE**

The purpose of this course is to introduce Python, a remarkably powerful dynamic programming language to write code for different operating systems along with application domain. Python has evolved on more popular and powerful open source programming tool

**PRERQUISITE :**NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To provide basic knowledge on Python programming concepts. |
| **2.** | To introduce different methods in list, string, tuple, dictionary and sets. |
| **3.** | To compute different programs using python control statements. |
| **4.** | To learn about different functions in python. |
| **5.** | To compute the exception handling functions and file concepts. |

**COURSE OUTCOMES**

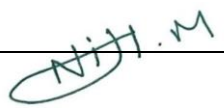
On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Learn python statements, comments and indentation, tokens, input and output methods using various example programs. | Understand |
| CO2. Apply the different methods involved in List, String, Tuples and Dictionary. | Apply |
| CO3. Design solutions for complex programs using decision making and looping statements. | Apply. |
| CO4.Apply the function programs with all the concepts like lambda and recursion. | Apply. |
| CO5. Compute the exception handling programs, file concept programs and understand the concepts . | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | M | M | - | - | - | - | - | - | - | M | M | M |
| CO2 | S | M | M | M | M | - | - | - | - | - | - | - | S | M | M |
| CO3 | M | S | S | S | M | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | S | S | S | M | - | - | - | - | - | - | - | S | S | M |
| CO5 | S | M | M | M | M | - | - | - | - | - | - | - | S | M | M |

S- Strong; M-Medium; L-Low



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**SYLLABUS**

**UNIT 1: INTRODUCTION**

Introduction to python-Advantages of python programming-Tokens-Variables-Input/output methods-Datatypes-Operators

**UNIT II: DATA STRUCTURES**

Strings-Lists-Tuples-Dictionaries-Sets

**UNIT III: CONTROL STATEMENTS**

Flow Control-Selection control Structure- iterative control structures.

**UNIT IV: FUNCTIONS**

Introduction-Declaration of function-Types of function-Types of Arguments-parameters-recursion and lambda function

**UNIT V: FILE HANDLING AND EXCEPTION HANDLING**

FILES:Open,read ,write, append ,close,tell and seek method,.Exception Handling:errors and exceptions-Raising exceptions-user defined exception

**LIST OF EXPERIMENTS**

1. Write a program to sum of series of N natural numbers
2. Write a program to calculate simple interest.
3. Write a program to generate Fibonacci series using for loop
4. Write a program to calculate factorial using while loop
5. Write a program to find the greatest of three numbers using if condition
6. Write a program for finding the roots of a given quadratic equation using conditional control statements
7. Write a program to find the greatest of three numbers using conditional operator
8. Write a program to compute matrix multiplication using the concept of arrays
9. Write a program to implement recursive function
10. Write a program to read and write data using file concepts

**TEXT BOOKS:**


1. Bill Lubanovic, "Introducing Python Modern Computing in Simple Packages", 2st Edition, O'Reilly Media, 2019.
2. Programming With Python- II 'Himalaya Publishing House Pvt Ltd, 2018.
3. "Dive Into Python3" by Mark Pilgrim, 2012


**REFERENCES:**


1. Mark Lutz, "Learning Python", 6th Edition, O'Reilly Media, 2014.
2. David Beazley, Brian K. Jones, "Python Cookbook", 3rd Edition, O'Reilly Media, 2015.
3. Mark Lutz, "Python Pocket Reference", 6th Edition, O'Reilly Media, 2015.


**COURSE DESIGNERS**


| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| 2 | Dr.V.Amirthalingam | Assistant Professor | CSE | amirthalingam@vmkvec.edu.in |


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| 34421E01 | BASICS OF CIVIL AND MECHANICALENGINEERING<br>PART-A BASICS OF CIVIL ENGINEERING<br>(Common to All Branches) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 2 | 0 | 0 | 2 |

**PREAMBLE :** The aim of the subject is to provide a fundamental knowledge of basic Civil Engineering

**PREREQUISITE-**NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand the basic concepts of surveying and construction materials. |
| 2 | To impart basic knowledge about building components. |

**COURSEOUTCOMES**

On the successful completion of the course,students will be able to

| | |
|---|---|
| CO1.An ability to apply knowledge of mathematics,science,and engineering. | Apply |
| CO2.An ability to design and conduct experiments,as well as to analyze and interpret data. | Apply |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | M | S | - | - | - | - | - | - | M | - | - |
| CO2 | S | M | L | S | M | S | - | - | M | - | - | - | - | S | - |

S-Strong; M-Medium; L-Low

**SYLLABUS**

**SURVEYINGANDCIVILENGINEERINGMATERIALS**

**SURVEYING:**Objects–types–classification–principles–measurements of distances–angles–levelling–determination of areas– illustrative examples.

**CIVILENGINEERINGMATERIALS:**Bricks –stones–sand –cement –concrete mix design and Quantity computation–steel sections.

**BUILDINGCOMPONENTSANDSTRUCTURES:**

**FOUNDATIONS:**Types,Safe Bearing capacity of Soil –Requirement of good foundations.

**SUPERSTRUCTURE:** Brick masonry – stone masonry – beams – columns – lintels – roofing – flooring – plastering –Mechanics – Internal and external forces –Load Transformation Mechanism in Structural Elements– stress – strain – elasticity – Types of Bridges and Dams – Basics of Interior Design and Land scaping– water supply – sources and quality of water — Rain water harvesting —introduction to high way and rail way.

**TEXTBOOKS:**


1. "BasicCivil and Mechanical Engineering", VMU, (2017). Company Ltd., New Delhi,2009.
2. "Basic Civil Engineering", S.S. Bhavikatti., New age International Publishers.
3. "Reinforced Concrete Structures" B.C. Punmia, Vol. 1 & 2, - Laxmi Publications, Delhi, 2004.


**REFERENCES:**


1. RamamruthamS.,"BasicCivilEngineering",DhanpatraiPublishingCo.(P)Ltd.,2009.
2. SeetharamanS.,"BasicCivilEngineering",AnuradhaAgencies.
3. IS 10262 : 2009 "Concrete Mix Proportioning – Guidelines"


**COURSEDESIGNERS**

| S. No. | NameoftheFaculty | Designation | Dept/College | MailID |
|---|---|---|---|---|
| 1 | S. Supriya | Assist.Professor | Civil/ VMKVEC | jansupriyanair@gmail.com |
| 2 | Mrs.Pa.Suriya | Asst.Professor | Civil/AVIT | suriya@avit.ac.in |

Dr. M. KUMAR,
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| 34421E01 | B-BASICS OF MECHANICAL ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 2 | 0 | 0 | 2 |

**Preamble**

Basic Mechanical Engineering gives the fundamental ideas in the areas of engineering design, manufacturing and Automobile engineering. An engineer needs to understand, the basic manufacturing techniques and working principle of an Automobile Engineering Components.

**Prerequisite –**NIL

**Course Objective**

| | |
|---|---|
| 1 | To demonstrate the principles of casting and metal joining processes in manufacturing. |
| 2 | To describe and to apply the in depth knowledge in automotive engines and important components. |

**Course Outcomes: On successful completion of the course, students will be able to**

| | | |
|---|---|---|
| CO1. | Illustrate the application of casting and metal joining processes in manufacturing | Apply |
| CO2. | Demonstrate the operation of automotive engines and important components | Apply |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | L | L | M | - | - | - | - | - | M | L | - | - |
| CO2 | S | M | L | L | L | M | - | - | - | - | - | M | L | - | - |

**S- Strong; M-Medium; L-Low**

**Syllabus**

**FOUNDRY AND WELDING**

Foundry: Introduction to Casting - Types, Pattern- Definition, Function. Foundry tools. Green Sand Moulding application.

Welding: Introduction to welding, Classification – Gas welding, Arc Welding, TIG, MIG, Plasma – Definitions. Arc Welding - Methods and Mechanisms – Applications.

**AUTOMOTIVE ENGINES AND COMPONENTS**

Introduction, Two stroke and four stroke cycle – Petrol and Diesel Engines - Construction and working, Fundamentals of automotive components - Brakes, Clutches, Governor, Flywheel, Axles, Drives etc., Fuel supply systems, Exhaust emission and control.

**Text Books**

| | |
|---|---|
| **1** | Basic Civil and Mechanical Engineering, School of Mechanical Engineering Sciences, VMU, Salem |

**Reference Books**

| | |
|---|---|
| **1** | Dan B Marghitu, Mechanical Engineer's Handbook, Academic Press, Auburn University, Alabama. |
| **2** | K.Venugopal, Basic Mechanical Engineering, Anuradha Publications, Chennai |
| **3** | N R. Banapurmath, Basic Mechanical Engineering, Vikas Publications, Noida |
| **4** | T J Prabu, Basic Mechanical Engineering, SCITECH Publications, Chennai |

**Course Designers**

| S.No | Faculty Name | Designation | Department / Name of the College | Email id |
|---|---|---|---|---|
| **1** | Dr. Sanjay Singh | Professor | Mech / VMKVEC | sanjay@vmkvec.edu.in |

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| 34621E81 | BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LAB<br>A. BASIC ELECTRICAL ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 0 | 0 | 2 | 1 |

**PREAMBLE**

It is a laboratory course which familiarizes the basic electrical wiring, measurement of electrical quantities and various types of earthing methods.

**PRERQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn the residential wiring and various types of electrical wiring. |
| 2 | To measure the various electrical quantities. |
| 3 | To know the necessity and types of earthing and measurement of earth resistance. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO 1: Implement the various types of electrical wiring. | Apply |
| CO 2: Measure the fundamental parameters of AC circuits. | Analyze |
| CO 3: Measure the earth resistance of various electrical machineries. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | -- | S | -- | -- | -- | -- | -- | -- | L | M | L | -- |
| CO2 | S | M | S | S | -- | -- | -- | -- | M | -- | -- | M | M | L | -- |
| CO3 | L | S | L | -- | S | -- | -- | -- | -- | L | -- | L | M | L | -- |

S- Strong; M-Medium; L-Low

**LIST OF EXPERIMENTS**

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring.
4. Measurement of electrical quantities – voltage, current, power & power factor in RLC circuit.
5. Measurement of energy using single phase energy meter.
6. Types of wiring, Joints and Measurement of resistance to earth of an electrical equipment.

**REFERENCES**

1. Laboratory Reference Manual.

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr. R. Devarajan | Professor | EEE/VMKVEC | devarajan@vmkvec.edu.in |
| 2 | Dr. G. Ramakrishnaprabu | Associate Professor | EEE/VMKVEC | ramakrishnaprabu@vmkvec.edu.in |
| 3 | Ms. D. Saranya | Assistant Professor (Gr-II) | EEE/AVIT | dsaranya@avit.ac.in |
| 4 | Mr. S. Prakash | Assistant Professor (Gr-II) | EEE/AVIT | sprakash@avit.ac.in |

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| 34621E81 | BASIC ELECTRICAL AND ELECTRONICS ENGINEERING LABPART B - BASIC ELECTRONICS ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 0 | 0 | 2 | 1 |

**PREAMBLE**

This course is to provide a practical knowledge in Basic Electronics Engineering. It starts with familiarization of electronic components and electronic equipment's. It enables the students to construct and test simple electronic projects

**PRERQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To familiarize the electronic components, basic electronic equipment's and soldering techniques. |
| 2 | To study the characteristics of Diodes, BJT and FET. |
| 3 | To understand the principles of various digital logic gates. |
| 4 | To understand the concept of basic modulation techniques |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Familiarize with the fundamentals of soldering techniques. | Understand |
| CO2. Construct experiments for PN and Zener diode characteristics also determine diode forward and reverse resistance | Apply |
| CO3. Construct clipper and clamper circuit and verify their voltage levels | Apply |
| CO4. Construct and justify operation simple voltage regulator for given Zener diode | Apply |
| CO5. Verify the truth tables and characteristics of logic gates (AND, OR, NOT, NAND, NOR, XOR). | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO 10 | PO1 1 | PO12 | PSO 1 | PSO2 | P S |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | - | - | - | - | - | - | L | - | - | - | M | - | - |
| **CO2** | S | M | M | M | - | - | M | - | L | - | - | L | - | M | - |
| **CO3** | S | M | M | - | - | - | - | - | L | - | - | - | S | - | - |
| **CO4** | S | M | M | M | - | - | M | - | L | - | - | L | M | - | - |
| **CO5** | S | M | - | - | - | - | - | - | L | L | - | L | S | - | L |

S- Strong; M-Medium; L-Low

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**Syllabus**

**LIST OF EXPERIMENTS**

1. Practicing of Soldering and Desoldering.
2. Characteristics of PN junction Diode and find the forward and reverse resistance
3.Construct and Study simple clipper and clamper circuits
4. Characteristics of Zener diode and determine the break down voltage and diode resistance
5.Construct and Study simple voltage regulator using zener diode
6. Verification of Logic Gates.
7. Find the characteristics of AND ,NOR,NOT gate
8. Construct and Study simple voltage regulator using zener diode.

**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department/ Name of the College | Mail ID |
|---|---|---|---|---|
| 1 | Dr.T.Sheela | Associate Professor | ECE / VMKVEC | sheela@vmkvec.edu.in |
| 2 | Mr.S.Selvaraju | Associate Professor | ECE / VMKVEC | selvaraju@vmkvec.edu.in |
| 3 | Mr.R.Karthikeyan | Assistant Professor (Gr-II) | ECE / AVIT | rrmdkarthikeyan@avit.ac.in |
| 4 | Ms.R.Mohana Priya | Assistant Professor (Gr-II) | ECE / AVIT | mohanapriya@avit.ac.in |

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| 34421E84 | ENGINEERING SKILLS PRACTICE LAB PART A- BASIC CIVIL ENGINEERING (Common to All Branches) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 0 | 0 | 2 | 1 |

**PREAMBLE**

Engineering Skills Practice is a hands- on training practice to Mechanical,Civil and Mechatronics Engineering students.It deals with fitting,carpentry, sheet metal and related exercises.Also,it will induce the habit of selecting right tools,planning the job and its execution

**PREREQUISITE**

Nil

**COURSEOBJECTIVES**

| | |
|---|---|
| 1 | To understand the basic concepts of building components. |
| 2 | To impart basic knowledge about Plumping and Carpentry works. |

**COURSEOUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.**Prepare the different types of fitting and plumbing lines. | Apply |
| **CO2**.Prepare the different types of joints using wooden material | Apply |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | L | L | L | L | L | L | L | L | L | L | L | - | S | - |
| CO2 | S | S | S | L | L | L | L | L | L | L | L | L | L | - | M |

S-Strong; M-Medium; L-Low

**SYLLABUS**

**Buildings:**

1. Studyofplumbingandcarpentrycomponentsofresidentialandindustrial buildings,Safety aspects.

**Plumbing and Carpentry Works:**

2. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in house hold fittings.
3. Preparationofplumbinglinesketchesforwatersupplyandsewageworks.
4. Hands on Exercise on Demonstrationofplumbingrequirementsofhigh-risebuildings.

**Carpentry using Power Tools only:**

5. Study of the joints in roofs, doors, windows and furniture.
6. Hands-on-exercise:Woodwork,joints by sawing,planning and cutting.

**TEXTBOOK**

1.Basic civil engineering LabManual by Department of Civil Engineering, VMRF.

**COURSEDESIGNERS**

| S.No | Name of the Faculty | Designation | Nameofthe College | Mail ID |
|---|---|---|---|---|
| 1 | M.Senthilkumar | Asst.Professor | Civil/ VMKVEC | senthilkumar@vmkvec.edu.in |
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| 34421E84 | ENGINEERING SKILLS PRACTICE LAB<br>B. BASIC MECHANICAL ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 0 | 0 | 2 | 1 |

**Preamble**

Workshop is a hands-on training practice to Mechanical Engineering students. It deals with fitting, carpentry, foundry and welding related exercises. Also, it will induce the habit of selecting right tools, planning the job and its execution.

**Prerequisite –**NIL

**Course Objective**

| | |
|---|---|
| 1 | To perform the practice in different types of fitting processes. |
| 2 | To executive joints using wooden materials. |
| 3 | To apply in depth knowledge in metal joining processes. |
| 4 | To demonstrate the pattern using foundry processes |

**Course Outcomes: On the successful completion of the course, students will be able to**

| | | |
|---|---|---|
| CO1. | Perform the different types of fitting using MS plate. | Apply |
| CO2. | Practice the different types of joints using wooden material | Apply |
| CO3. | Demonstrate the different types of joints in metal by Arc Welding | Apply |
| CO4. | Utilize the different types of green sand mould | Apply |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | - | L | - | - | - | - | - | M | - | - | - | L | - | - |
| CO2 | S | - | L | - | - | - | - | - | M | - | - | - | L | - | - |
| CO3 | S | - | - | - | - | - | - | - | - | - | - | - | L | - | - |
| CO4 | S | - | L | - | - | - | - | - | M | - | - | - | L | - | - |

**S- Strong; M-Medium; L-Low**

**Syllabus**

**LIST OF EXPERIMENTS**

Tee – Fitting
Vee – Fitting
Preparation of a mould for a single piece pattern
Preparation of a mould for a split piece pattern
Half- Lap Joint in Carpentry
Dove Tail Joint in Carpentry
Lap Joint – Welding
Butt Joint – Welding

**Text Books**

| | |
|---|---|
| **1** | **BASIC MECHANICAL ENGINEERING, LAB MANUAL** |

**Reference Books**

| | |
|---|---|
| **1** | K.Venugopal, Basic Mechanical Engineering, Anuradha Publications, Chennai |
| **2** | NR. Banapurmath, Basic Mechanical Engineering, Vikas Publications, Noida |

**Course Designers**

| S.No | Faculty Name | Designation | Department / Name of the College | Email id |
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| 34421E81 | ENGINEERING GRAPHICS AND DESIGN | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 1 | 0 | 4 | 3 |

**Preamble**

Engineering Graphics is referred as language of engineers. An engineer needs to understand the physical geometry of any object through its orthographic or pictorial projections. The knowledge on engineering graphics is essential in proposing new product through drawings and interpreting data from existing drawings. This course deals with orthographic and pictorial projections, sectional views and development of surfaces.

**Prerequisite** - NIL

**Course Objective**

| | |
|---|---|
| 1 | To implement the orthographic projections of points, straight lines, plane surfaces and solids. |
| 2 | To construct the orthographic projections of sectioned solids and true shape of the sections. |
| 3 | To develop lateral surfaces of the uncut and cut solids. |
| 4 | To draw the pictorial projections (isometric and perspective) of simple solids. |
| 5 | To draw the orthographic views from the given pictorial view. |

**Course Outcomes: On the successful completion of the course, students will be able to**

| | | |
|---|---|---|
| CO1. | Execute in the form of drawing of the orthographic projections of points, straight lines, plane surfaces and solids. | Apply |
| CO2. | Demonstrate in the form of drawing of the orthographic projections of sectioned solids and true shape of the sections. | Apply |
| CO3. | Develop lateral surfaces of the solid section and cut section of solids. | Apply |
| CO4. | Draw the pictorial projections (isometric and perspective) of simple solids. | Apply |
| CO5. | Draw the orthographic views from the given pictorial view. | Apply |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | L | S | L | | | | | | | | L | | |
| CO2 | S | S | L | S | L | | | | | | | | L | | |
| CO3 | S | S | L | S | L | | | | | | | | L | | |
| CO4 | S | M | L | S | S | | | | | | | | L | | |
| CO5 | S | S | L | S | L | | | | | | | | L | | |

**S- Strong; M-Medium; L-Low**

**Syllabus**

**PLANE CURVES AND DIMENSIONING**

Basic Geometrical constructions, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Dimensioning. Projection of points.

**PROJECTION OF SOLIDS**

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to any one reference plane by change of position method.

**SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES**

Sectioning of above solids in simple vertical position by cutting planes inclined to any one reference plane and perpendicular to the other – Obtaining true shape of section.

Development of lateral surfaces of simple and truncated solids like Prisms, pyramids, cylinders and cones.

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**ORTHOGRAPHIC VIEWS AND ISOMETRIC VIEWS –** First angle projection – layout views – Representation of Three Dimensional objects -multiple views from pictorial views of objects. Principles of isometric View – isometric scale – Principles of isometric projection – isometric scale – Isometric projections of simple solids and truncated solids – Prisms, pyramids, cylinders, cones.

**INTRODUCTION TO AUTO CAD**

Introduction to Auto CAD- Basic introduction and operational instructions of various commands in Auto CAD. Limit System- Tolerance, Limits, Deviation, Actual Deviation, Upper Deviation, Lower Deviation,Allowance. Preparation of manual parts drawing and assembled sectional views from orthographic part drawings,

**Text Books**

| | |
|---|---|
| **1** | Natarajan K V, "Engineering Graphics", Tata McGraw-Hill Publishing Company Ltd. New Delhi. |
| **2** | K.Venugopal and V.Prabhu Raja, "Engineering Graphics", New Age International Private Limited. |
| **3** | K.R.Gopalakrishna"Engineering Drawing" (Vol. I & II), Subhas Publications, 2014. |
| **4** | Bhatt-N.D.-"Machine Drawing"-Published by R.C.Patel- Chartstar Book Stall- Anand-India- 2003 |

**Reference Books**

| | |
|---|---|
| **1** | N.D. Bhat and V.M. Panchal, Engineering Graphics, Charotar Publishers 2013 |
| **2** | E. Finkelstein, "AutoCAD 2007 Bible", Wiley Publishing Inc., 2007 |
| **3** | R.K. Dhawan, "A text book of Engineering Drawing", S. Chand Publishers, Delhi,2010. |
| **4** | DhananjayA.Jolhe, "Engineering Drawing with an Introduction to AutoCAD", Tata McGraw Hill Publishing Company Limited, 2008. |
| **5** | G.S. Phull and H.S.Sandhu, "Engineering Graphics", Wiley Publications, 2014. |

**Course Designers**

| S.No | Faculty Name | Designation | Dept / College | Email id |
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| **2** | Dr. N.Rajan | Professor | Mech / VMKVEC | rajan@vmkvec.edu.in |

**Alternative NPTEL/SWAYAM Course:**

| S. No. | NPTEL Course Name | Instructor | Host Institute | Duriation |
|---|---|---|---|---|
| 1. | Engineering Graphics and Design | Prof. Naresh Varma Datla, Prof. S. R. Kale | IIT Delhi | 12 weeks |
| 2. | Engineering Drawing | Robi, P.S. | IIT Guwahati | 12 weeks |
| 3. | Engineering Drawing and Computer Graphics | Prof. Rajaram Lakkaraju | IIT Kharagpur | 12 weeks |

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| 35021E03 | PROGRAMMING FOR PROBLEM SOLVING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | FC-ES | 3 | 0 | 0 | 3 |

**PREAMBLE**

The course is designed to introduce basic problem solving and program design skills that are used to create computer programs. It gives engineering students an introduction to programming and developing analytical skills to use in their subsequent course work and professional development. This course focuses on problem solving, algorithm development, top-down design, modular programming, debugging and testing using the programming constructs like flow-control, looping, iteration and recursion. It presents several techniques using computers to solve problems, including the use of program design strategies and tools, common algorithms used in computer program and elementary programming techniques.

**PREREQUISITE–NIL**

**COURSEOBJECTIVES**

| | |
|---|---|
| **1.** | To gain basic knowledge about simple algorithms for arithmetic and logical problems. |
| **2.** | To learn how to write a program, syntax and logical errors. |
| **3.** | To understand how to decompose a problem into functions and synthesize a complete program. |

**COURSEOUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Formulate simple algorithms for arithmetic and logical problems. | Understand |
| CO2: Test and execute the programs and correct syntax and logical errors | Apply |
| CO3: Implement conditional branching, iteration and recursion. | Apply |
| CO4: Decompose a problem into functions and synthesize a complete program. | Analyze |
| CO5: Use arrays, pointers, strings and structures to formulate algorithms and programs | Apply |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO2** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO3** | M | M | S | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO4** | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| **CO5** | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |

S-Strong; M-Medium; L-Low

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**SYLLABUS**

**UNIT – I: INTRODUCTION**

Computer system: components of a computer system-computing environments-computer languages, creating and running programs, Algorithms, flowcharts- Introduction to C language: basic structure of programs, process of compiling and running program, -tokens, keywords, identifiers, constants, strings, special symbols, variables, data types-I/O statements

**UNIT – II: OPERATORS, EXPRESSIONS AND CONTROL STRUCTURES**

Operators and expressions: Operators- arithmetic- relational and logical- assignment operators-increment and decrement operators- bitwise and conditional operators-special operators- operator precedence and associativity- evaluation of expressions-type conversions in expressions- Control structures: Decision statements: if and switch statement- Loop control statements: while, for and do while loops- jump statements- break- continue- goto statements.

**UNIT – III: ARRAYS AND FUNCTIONS**

Arrays: One dimensional array-declaration and initialization of one dimensional arrays- two dimensional arrays- initialization and accessing- multidimensional arrays- Basic Algorithms: Searching- Basic Sorting Algorithms- Functions: User defined and built-in Functions- Parameter passing in functions-call by value-Passing arrays to functions-call by reference,-Recursion-Example programs, such as Finding Factorial, Fibonacci series

**UNIT – IV: STRINGS AND POINTERS**

Strings: Arrays of characters- variable length character strings-inputting character strings-character library functions-string handling functions- Pointers: Pointer basics- pointer arithmetic-pointers to pointers-generic pointers-array of

Pointers- functions returning pointers,-Dynamic memory allocation

**UNIT – V: STRUCTURES AND FILE HANDLING**

Structures and unions: Structure definition- initialization- accessing structures,-nested structures,-arrays of structures-structures and functions- unions- typedef- enumerations.-File

handling :command line arguments- File modes- basic file operations read,-write and append

**TEXTBOOKS**

1. Schaum's Outline of Programming with C by Byron Gottfried , McGraw-Hill, 2017

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**REFERENCES**


1. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education, 2015.
2. Problem Solving and Program Design in C, by Jeri R. Hanly, Elliot B. Koffman, Pearson Addison-Wesley, Seventh Edition 2013.


**Course Designers:**


| S.No. | Name of the Faculty | Designation | Department | MailID |
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| 35021C02 | DATA STRUCTURES | CATEGORY | L | T | P | CREDIT |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course aims at understanding the basic concepts in programming structures, linear structures and non linear structures

**PRERQUISITE -** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To remember and understand the basic concepts in linear structures |
| **2.** | To learn about tree structures. |
| **3.** | To understand about balanced trees |
| **4.** | To learn about hashing and sets. |
| **5.** | To learn and understand about graphs and sorting |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Remember the basic concepts in linear structures | Understand |
| CO2. Learn about tree structures and tree traversals | Apply |
| CO3. Understand about balanced trees | Apply |
| CO4. Learn about hashing and sets. | Apply |
| CO5. Learn and understand about graphs and sorting | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | - | - | - | - | - | - | - | - | M | S | S | S |
| CO2 | S | M | M | M | M | - | - | - | - | - | - | M | S | S | S |
| CO3 | S | M | L | M | M | - | - | - | - | - | - | M | S | S | M |
| CO4 | S | M | M | M | M | - | - | - | - | - | - | L | S | S | M |
| CO5 | S | M | L | M | M | - | - | - | - | - | - | M | S | S | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**Introduction:** Basic Terminologies: Elementary Data Organizations, Data Structure Operations: insertion, deletion, traversal etc.; Analysis of an Algorithm, Asymptotic Notations, Time-Space trade off. Searching: Linear Search and Binary Search Techniques and their complexity analysis.

**Linear Structures**

Abstract Data Types (ADT) – List ADT – array-based implementation – linked list implementation – cursor-based linked lists – doubly-linked lists – applications of lists –Stack ADT – Queue ADT – circular queue implementation – Applications of stacks and queues.

**Tree Structures**

Tree ADT – tree traversals – Balanced Trees: AVL Trees – Splay Trees – B-Tree - heaps – binary heaps – applications of binary Heaps**.**

**Hashing and Set**

Hashing – Separate chaining – open addressing – rehashing – extendible hashing -Disjoint Set ADT – dynamic equivalence problem – smart union algorithms – path compression – applications of Set.

**Graphs**

Definitions – Topological sort – breadth-first traversal - shortest-path algorithms –minimum spanning tree – Prim's and Kruskal's algorithms – Depth-first traversal – bi-connectivity – Euler circuits – applications of graphs.Sorting algorithms: Insertion sort - Selection sort -Quick sort - Merge sort - Bubble sort - Shell sort – Radix sort.

**TEXT BOOKS**:

1. **1.** Mark A. Weiss, "Data Structures and Algorithm Analysis in C (2nd Edition), Pearson Education, 2002

**REFERENCES:**

2. A. V. Aho, J. E. Hopcroft, and J. D. Ullman, "Data Structures and Algorithms", Pearson Education, First EditionReprint. R. F. Gilberg, B. A. Forouzan, "Data Structures", Second Edition, Thomson India,Edition, 2005.

**COURSE DESIGNERS**

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| 35021C01 | COMPUTER ARCHITECTURE AND ORGANIZATION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**

The course is dedicated to number system, logic design, and memory and processing. This is the only course that is concerned with the hardware of a computer, its logic design and organization. It aims at making the student familiar with digital logic and functional design of arithmetic and logic unit that is capable of performing floating point
arithmetic operations.

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To provide knowledge on overview of computer Architecture, function and addressing modes. |
| 2 | Hardware and software implementation of arithmetic unit. |
| 3 | To provide knowledge of memory technologies, interfacing techniques and subsystem devices |
| 4 | Apply the knowledge of methods to solve arithmetic problems. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1 Provide fundamentals of Architecture, Registers, machine instructions and addressing modes | Understand |
| CO2 . Comprehend the various Architecture for computer arithmetic and pipeline concepts. | Apply |
| CO3 Analyse the performance of various memory modules in memory hierarchy | Analyse |
| CO4 Provide the features of Peripheral devices and Interfaces. | Understand |
| CO5 Outline the evaluation of multicore architectures, structure of disk drives and RAID architectures. | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | - | M | - | - | - | - | - | - | - | L | M | M | - |
| CO2 | M | M | M | M | - | - | - | - | - | - | - | L | M | M | - |
| CO3 | M | M | S | M | - | - | - | - | - | - | - | - | S | | - |
| CO4 | S | M | M | | - | - | - | - | - | - | - | - | S | M | - |
| CO5 | S | - | M | L | - | - | - | - | - | - | - | - | S | | - |
| CO6 | M | M | M | S | - | - | - | - | - | - | - | L | M | M | |

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**SYLLABUS**

**1. Introduction to Computer Architecture**

Overview of Computer Organization and Architecture- Interconnection Structures - Bus interconnection-Machine instructions and addressing modes- Registers and register files - Addressing modes-Instruction set.

**2. Central Processing Unit**

CISC & RISC- ALU- data path and control unit- Micro programming control unit- Instruction pipe lining.

**3 Memory Organization**

Characteristics of Memory- Memory Hierarchy- Memory system overview -Main Memory organization -Cache memory- Cache memory principles – Elements of Cache design- address mapping - Virtual memory systems mapping functions, replacement algorithms

**4. Peripheral devices and their characteristics**

I/O fundamentals: handshaking, buffering; I/O techniques: programmed I/O- interrupt-driven I/O- DMA- I/O device interfaces

**5. Device Subsystems**

External storage systems- organization and structure of disk drives and optical memory- RAID. Multi-Core Architectures: Flynn's Classification- Moore's Law- Hyper-Threading- Multi threading- Single core- multiprocessor- Multi-Core- Amdahl's law

TEXT BOOKS:


1. William Stallings, Computer Organization and Architecture 10th Ed, Pearson, 2019
2. M. M. Mano, Computer System Architecture, 3rd ed., Prentice Hall of India, 1993.


REFERENCES:


1. Hency Patterson, Quantative Approach –Computer Architecture, Elsevier, 4th edition, 2006.
2. Shameem Akhter and Jason Roberts, Multi-Core Programming, 1st edition, Intel Press, 2012
3. John P. Hayes, Computer Architecture and Organization, McGraw Hill Education, 5 edition, 2017.


**COURSE DESIGNERS**

| S. No. | Name of the faculty | Designation | Department | Mail Id |
|---|---|---|---|---|
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| 35021C18 | OPERATING SYSTEM (THEORY AND PRACTICALS) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 2 | 4 |

**PREAMBLE**

The student will be able to understand the concepts of operating system, scheduling algorithms, Inter process communication, threads, disk management and file systems.

**PREREQUISITE:**NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To be aware of the evolution of operating systems, process scheduling, CPU utilization and scheduling algorithms |
| 2. | To learn what processes are, how processes communicate, how process synchronization is done and how to manage processes. |
| 3. | To have an understanding of the memory management techniques. |
| 4. | To learn and understand the disk management systems |
| 5. | To learn and understand the file management systems |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Develop algorithms for process scheduling for a given specification of CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time. | Apply |
| CO2. To Understand the process synchronization concepts for the given scenario in operating systems environment. | Understand |
| CO3. Able to develop the techniques for optimally allocating memory to processes by increasing memory utilization and for improving the access time. | Apply |
| CO4.Apply the I/O Subsystem concepts for a given scenario. | Apply |
| CO5. Design and implement file management system. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | M | - | - | - | - | - | - | - | - | S | S | - |
| CO2 | S | S | | M | - | - | - | - | - | - | - | - | S | M | - |
| CO3 | S | S | | M | - | - | - | - | - | - | - | - | S | M | - |
| CO4 | S | M | L | M | - | - | - | - | - | - | - | - | S | L | M |
| CO5 | S | M | L | L | - | - | - | - | - | - | - | - | S | M | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Introduction: Concept of Operating Systems, Types of Operating Systems, Concept of Virtual Machine, Different states of a Process, Thread: Definition, Various states, Benefits of threads, Types of threads, Concept of multi threads, Process Scheduling: Foundation and Scheduling objectives, Types of Schedulers, Scheduling, criteria: CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time; Scheduling algorithms: Pre-emptive and Non pre-emptive, FCFS, SJF, RR; Multiprocessor scheduling: Real Time scheduling: RM and EDF.

**INTER PROCESS COMMUNICATION**

Critical Section, Race Conditions, Mutual Exclusion, Hardware Solution, Strict Alternation, Peterson's Solution, The Producer\Consumer Problem, Semaphores, Event Counters, Monitors, Message Passing,

Classical IPC Problems: Reader's & Writer Problem, Dinning Philosopher Problem etc. Deadlocks: Definition, Necessary and sufficient conditions for Deadlock, Deadlock Prevention, Deadlock Avoidance: Banker's algorithm, Deadlock detection and Recovery..

**MEMORY MANAGEMENT**

Logical and Physical address map, Memory allocation, Paging, Page allocation – Hardware support for paging, Protection and sharing, Disadvantages of paging. Basics of Virtual Memory – Hardware and control structures – Locality of reference, Page fault , Working Set , Dirty page/Dirty bit – Demand paging, Page Replacement algorithms: Optimal, First in First Out (FIFO), Second Chance (SC), Not recently used (NRU) and Least Recently used (LRU).

**DISK MANAGEMENT**

Disk structure, Disk scheduling - FCFS, SSTF, SCAN, C-SCAN, Disk reliability, Disk formatting, Boot-block, Bad blocks.I/O Hardware: I/O devices, Device controllers, Direct memory access Principles of I/O.Secondary-Storage Structure: Disk structure, Disk scheduling algorithms..

**FILE MANAGEMENT**

Concept of File, Access methods, File types, File operation, Directory structure, File System structure, Allocation methods (contiguous, linked, indexed),Free-space management (bit vector, linked list, grouping), directory implementation (linear list, hash table), efficiency and performance.

**LIST OF PRACTICALS**

1. Basics of UNIX commands.
2. Shell programming
3. Implementation of CPU scheduling. a) Round Robin b) SJF c) FCFS d) Priority
4. Implement all file allocation strategies
5. Implement Semaphores
6. Implement File Organization Techniques
7. Implement Bankers algorithm for Dead Lock Avoidance
8. Implement an Algorithm for Dead Lock Detection

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9. Implement the all page replacement algorithms a) FIFO b) LRU c) LFU

10. Implement Shared memory and IPC

**TEXT BOOKS:**

1. Silberschatz, Galvin, and Gagne, "Operating System Concepts", 10th Edition, Wiley India Pvt. Ltd, 2018..

## References


1) Operating Systems: Internals and Design Principles, 5th Edition, William Stallings,Prentice Hall of India.
2) Operating System: A Design-oriented Approach, 1st Edition by Charles Crowley, Irwin Publishing
3) Operating Systems: A Modern Perspective, 2nd Edition by Gary J. Nutt, Addison-Wesley
4) Design of the Unix Operating Systems, 8th Edition by Maurice Bach, Prentice-Hall of India
5) Understanding the Linux Kernel, 3rd Edition, Daniel P. Bovet, Marco Cesati, O'Reilly and Associates.


**COURSE DESIGNERS**

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| 35021C05 | DESIGN AND ANALYSIS OF ALGORITHMS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**

This subject introduces students the concepts of design and analysis of algorithms. On completion of this course students will be able to:

i) Learn the algorithm analysis techniques.
ii) Become familiar with the different algorithm design techniques
iii) Construct efficient algorithms for solving engineering problems by using appropriate algorithm design paradigms and data structures.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To familiarize the student with good programming design methods, particularly Top- Down design. |
| 2. | To develop algorithms for manipulating stacks, queues, linked lists, trees, graphs |
| 3. | To create the data structures for implementing the above algorithms |
| 4. | To construct the recursive algorithms as they apply to trees and graphs |
| 5. | To familiarize the student with the issues of Time complexity and examine various algorithms from this perspective |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Analyse the correctness of algorithms using induction and loop in variants. | Analyze |
| CO2. Analyse the worst-case, best-case and average-case running time of algorithms using asymptotic. | Analyze |
| CO3. Analyse the performance of a sequence of operations using amortized analysis techniques like potential method and accounting method. | Analyze |
| CO4. Construct algorithms using design paradigms like divide and conquer, greedy and dynamic programming for a given problem. | Analyze |
| CO5. Infer when a design scenario requires the application of the different algorithm design paradigms. | Apply |
| CO6. Analyse how the performance of an algorithm is affected based on the choice of data structures the algorithm uses. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | - | - | - | - | - | - | - | - | - | S | M | M |
| CO2 | S | M | M | - | - | - | - | - | - | - | - | - | S | S | M |
| CO3 | M | M | S | - | - | - | - | - | - | - | - | - | S | M | M |
| CO4 | S | M | | - | - | - | - | - | - | - | - | - | S | S | M |
| CO5 | M | M | M | - | - | - | - | - | - | - | - | - | S | M | S |

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| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO6 | M | M | M | - | - | - | - | - | - | - | - | - | S | M | M |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**INTRODUCTION TO ALGORITHMS**

The role of algorithms in computing, Growth of functions, Asymptotic notations, Designing and Analyzing algorithms-an Introduction using insertion sort. Review on the Math needed for algorithm design and analysis.

**DIVIDE AND CONQUER**

Solving recurrences – The Substitution method, Recurrence Tree method and Master's method, Multiplying large integers, Binary Search, Sorting [Merge Sort and Quick Sort], Selection in linear time [Expected and Worst-case], Strassen"s algorithm for Matrix Multiplication, The maximum sub-array problem.

**GREEDY ALGORITHMS**

Characteristics of Greedy algorithms, The problem of making change, Greedy algorithms for Scheduling, Minimum Spanning Trees – Kruskal's Algorithm and Prim's Algorithm, Greedy Algorithms for finding the shortest paths in a Graph, The Knapsack problem Amortized Analysis: The accounting method, The potential method.

**DYNAMIC PROGRAMMING**

Calculating the binomial co-efficient, The problem of making change, The Knapsack problem, Chained matrix multiplication, Finding the shortest paths in a Graph, Reformulating Dynamic programming algorithms using recursion and memory functions.

**GRAPH ALGORITHMS**

Depth-first search & Breadth-First Search, Flow Networks, Topological sort, Strongly connected components Computational Complexity: Classes P and NP, Polynomial reductions, Classes NP-Complete and NP-Hard. Heuristics: Graph Coloring problem, Travelling Sales Person problem.

**TEXT BOOKS:**

1. Charles E. Leiserson, "Thomas H. Cormen, Ronald L. Rivest, Clifford Stein – Introduction to Algorithms", Third edition, PHI, 2010

**REFERENCES:**

1. Gilles Brassard and Paul Bratley, "Fundamentals of Algorithmic", PHI, 2000.
2. Sara Baase - Computer algorithms: Introduction to Design and Analysis –, Addison Wesley publication, 1998.

**COURSE DESIGNERS**

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| 35021C04 | DATABASE MANAGEMENT SYSTEMS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**

This course aims at facilitating the student to understand the various concepts and functionalities of Database Management Systems, the method and model to store data and how to manipulate them through query languages, the effective designing of relational database and how the system manages the concurrent usage of data in multi user environment.

**PREREQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Describe a relational database and object-oriented database. |
| 2 | Create, maintain and manipulate a relational database using SQL. |
| 3 | Describe ER model and normalization for database design. |
| 4 | Examine issues in data storage and query processing and can formulate appropriate solutions. |
| 5 | Design and build database system for a given real world problem. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Illustrate the database design for applications and database adminstrators. | Understand |
| CO2. Build and manipulate the relational database using Structured Query Language and relational languages. | Apply |
| CO3. Develop a normalized database for a given application by incorporating various constraints like integrity and value constraints. | Apply |
| CO4. Apply concurrency control & recovery mechanism for database problems. | Apply |
| CO5. Construct data structures like indexes and hash tables for the fast retrieval of data. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | M | M | - | - | - | - | - | M | S | S | M | S |
| CO2 | M | M | M | L | M | - | - | - | - | - | M | M | S | M | S |
| CO3 | M | M | S | M | M | - | - | - | - | - | M | L | S | M | S |
| CO4 | S | M | M | M | L | - | - | - | - | - | M | M | S | S | S |
| CO5 | S | M | M | M | M | - | - | - | - | - | M | M | S | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Database-System Applications - Purpose of Database Systems - View of Data - Database Languages - Database Design - Database Engine - Database and Application Architecture - Database Users and Administrators - History of Database Systems

**RELATIONAL APPROACH**

The relational Model - Additional & Extended Relational - Types of Keys - Relational Algebra - Null Values - Domain Relational Calculus - Tuple Relational Calculus - Fundamental operations - Additional Operations- SQL fundamentals - Structure of SQL Queries - SQL Data Types and Schemas - Nested Sub queries - Complex Queries - Integrity Constraints - Triggers - Security - Advanced SQL Features - Embedded SQL- Dynamic SQL- Views - Introduction to Distributed Databases and Client/Server Databases..

**RELATIONAL DATABASE DESIGN**

Overview of the Design Process - Functional Dependencies - Non-loss Decomposition - Functional Dependencies - Normalization and its Types - Dependency Preservation - Boyce/Codd Normal Form- Decomposition Using Multi-valued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form - Entity Sets and its Types.

**TRANSACTION &CONCURRENCY CONTROL**

Transaction Concepts - Transaction State - Transaction Recovery - ACID Properties - System Recovery - Media Recovery - Two Phase Commit - SQL Facilities for recovery -Advanced Recovery Techniques - Buffer Management - Remote Backup Systems - Concurrency Control - Need for Concurrency - Locking Protocols -Two Phase Locking - Internet Locking - Deadlock Handling - Serializability - Recovery Isolation Levels - SQL Facilities for Concurrency.

**STORAGE STRUCTURE**

Introduction to Storage and File Structure - Overview of Physical Storage Media - Magnetic Disks - RAID - Tertiary storage - File Organization - Organization of Records in Files - Indexing and Hashing - Ordered Indices - B+ tree Index Files - B- tree Index Files - Bitmap Indices - Static Hashing - Dynamic Hashing -Query Processing - Catalogue Information for Cost Estimation – Selection Operation - Sorting - Join Operation - Query optimization - Database Data Analysis.

**TEXT BOOKS:**


1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, “Database System Concepts”, Seventh Edition, McGraw-Hill Education; 6 edition, 2019).


**REFERENCES:**


1. Ramez Elmasri, Shamkant B. Navathe, “Fundamentals of Database Systems”, Pearson India; 7th edition, 2017, 2017).

2. Raghu Ramakrishnan and Johannes Gehrke, “Database Management Systems”, Third Edition, McGraw Hill, 2002.

3. Carlos Coronel, Steven Morris , “Database Systems – Design, Implementation and Management, 13th Edition, Cengage Learning; 13th edition, 2018) .


**COURSE DESIGNERS**

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| 35021C06 | OBJECT ORIENTED PROGRAMMING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Computer science students and enables them to learn Object Oriented Programming and the design of computer solutions in a precise manner. The syllabus emphasizes on OOP concepts, Functions, Polymorphism, Inheritance and I/O. The intention is to provide sufficient depth in these topics to enable candidates to apply Object Oriented Programming approach to programming. The modules in the syllabus reflect solving general problems via programming solution. Thus, modules collectively focus on programming concepts, strategies and techniques; and the application of these toward the development of programming solutions.

**PRERQUISITE**

Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To learn about the syntax and semantics of C++ programming language |
| 2. | To learn about the concepts of object oriented programming. |
| 3. | To determine how to reuse the code, Constructors and member functions |
| 4. | To Analyse how to reduce the coding by applying overloading concepts |
| 5. | To Analyse how to reuse the code, how to verify and validate the coding |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Explain fundamental programming concepts such as variables, conditional statements, looping constructs | Apply |
| CO2 Apply derived data types and methods (procedures), inline function, friend function in applications | Apply |
| CO3. Develop object-oriented programs for a given application using the concepts of compile-time and run-time polymorphism | Analyze |
| CO4. Apply operator overloading and inheritance in solving real time problems | Analyze |
| CO5. Construct object-oriented applications for a given scenario using files, Sting handling and to handle exceptions | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO 10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | M | - | - | - | - | - | M | L | M | M | M |
| CO2 | M | M | M | M | M | - | - | - | - | - | M | L | M | M | M |
| CO3 | M | M | S | M | S | - | - | - | - | - | M | L | S | M | M |
| CO4 | S | M | M | M | S | - | - | - | - | - | M | L | S | M | S |
| CO5 | S | M | M | M | M | - | - | - | - | - | M | L | M | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION TO OOPS AND C++**

Introduction to Object Oriented Programming and C++: Object oriented concepts and its characteristics - History of C++ - Applications of C++ - Structure of C++ - Tokens – Keywords – Identifiers - Basic data types - Input and output statements - C++ Operators and control statements.

## DERIVED DATA TYPES AND FUNCTIONS

Derived data types: Arrays – Structures - Unions - Type casting - Symbolic constants - Scope resolution operator -Functions: Function Prototyping - Function components - Passing parameters – Call by value - Call by reference - Inline function - Default arguments - Overloaded function- Introduction to friend function.

## CLASSES AND OBJECTS

Classes and Objects: Class specification - Member function definition - Access qualifiers - Instance creation - Static data members and member functions - Array of objects - Objects as arguments - Returning objects – Constructors - Parameterized Constructors - Overloaded Constructors - Constructors with default arguments - Copy constructors – Destructors.

## OPERATOR OVERLOADING AND INHERITANCE

Operator Overloading - Operator function – Overloading unary and binary operator – Inheritance Introduction – Types of Inheritance - Constructors in derived class - Abstract classes - Runtime Polymorphism– Virtual functions - Pure virtual functions – Templates - Function templates- class templates.

## STREAMS, FILES AND EXCEPTION HANDLING

Streams: Streams in C++ - Stream classes - Formatted and unformatted data – Manipulators - File streams - File pointer and manipulation - File open and close - Sequential and random access - Name Space.

Exception Handling: Principle of exception handling - Exception handling mechanism - Multiple catch statements - Nested try statements.

**TEXT BOOKS:**


1. Robert Lafore, "Object-Oriented Programming in C++" Pearson Education, 4 Edition, 2009.
2. K R Venugopal, RajkumarBuyya "Mastering C++" Tata McGraw Hill, New Delhi, Second edition 2015.
3. B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2013.
4. Bjarne stroustrup, The C++ programming Language, Addison Wesley, 4rd edition2018.
5. Harvey M. Deitel and Paul J. Deitel, C++ How to Program, 7th edition, Prentice Hall, 2010.
6. Tony Gaddis, Starting Out with Java: From Control Structures through Objects, 4/E, Addison-Wesley, 2009.


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| 35021C08 | COMPILER DESIGN AND AUTOMATA THEORY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enables them to learn about compiler design. Its helps the students to study about language processing systems, phases of compiler, parsing techniques, symbol table management, intermediate code generation, code optimization and generation and introduction to finite automata and regular expression.

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To introduce the major concept areas of language translation and compiler design. |
| 2. | To develop an awareness of the function and complexity of compilers. |
| 3. | To learn the role of a parser and to study the different ways of recognizing and parsing of tokens. |
| 4. | To study the concepts of code generation and concepts of Code Optimization and about various code improving transformations |
| 5 | To understand the concepts of automata theory |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand the major phases of compilation and the use of a tool to generate lexical analyzer | Understand |
| **CO2:** Understand and Apply context-free grammar and to design parsers | Understand |
| **CO3:** Design and implement intermediate code generation | Apply |
| **CO4**: Apply for various optimization techniques and code generation | Apply |
| **CO5:** To understand the concepts of automata theory | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | S | - | - | - | - | - | - | - | - | L | L | - | - | - |
| CO2 | S | M | - | L | - | - | - | - | - | - | - | L | - | - | - |
| CO3 | M | M | L | L | - | - | - | M | - | - | - | - | - | - | - |
| CO4 | M | S | L | - | - | L | - | - | - | L | - | M | - | - | - |
| CO5 | M | M | - | - | M | - | - | - | M | - | - | M | - | - | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**UNIT - I INTRODUCTION TO COMPILERS**

Compilers – Analysis of the source program – Phases of a compiler – Cousins of the Compiler – Grouping of Phases – Compiler construction tools – Lexical Analysis – Role of Lexical Analyzer – Input Buffering – Specification of Tokens.

**UNIT - II SYNTAX ANALYZER**

Role of the parser -Types of Grammar - Ambiguity in Grammar – Parse Tree – Syntax Tree –Writing Grammars –Context-Free Grammars – Top Down parsing – Predictive Parsing – Bottom-up parsing – Shift Reduce Parsing – LR Parsers – SLR Parser .

**UNIT - III INTERMEDIATE CODE GENERATOR**

Intermediate Code Generation – Introduction, Implementation of Three Address Code, Types of Three Address Statements Code Generation -Intermediate languages – Declarations – Assignment Statements – Boolean Expressions.

**UNIT - IV CODE OPTIMIZATION AND CODE GENERATION**

Introduction– Principal Sources of Optimization – Peephole Optimization- Issues in the design of code generator- DAG representation of Basic Blocks.

**UNIT –V AUTOMATA AND REGULAR EXPRESSIONS 9**

Finite Automata (FA) – Deterministic Finite Automata (DFA) – Non-deterministic Finite Automata (NFA) – Finite Automata with Epsilon transitions. Regular Expression – FA and Regular Expressions – Applications of Regular Expression – Closure properties of regular languages

**TEXT BOOKS**


1. Alfred V.Aho, Ravi Sethi, Jeffrey D. Ullman, Compiler Principles, Techniques and Tools, Published 2013 by Pearson Education Limited.
2. J.E. Hopcroft, R. Motwani and J.D. Ullman, "Introduction to Automata Theory, Languages and Computations", second Edition, Pearson Education, 2007.


**REFERENCES**


1. Yunlin Su, Song Y. Yan, Principles of Compilers: A New approach to Compilers including the Algebraic Method,Springer edition, 2011.
2. Compiler Design in C – Holub, Prentice Hall, 1992.


**COURSE DESIGNERS**

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| 35021C09 | COMPUTER NETWORKS (THEORY AND PRACTICALS) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 2 | 4 |

**PREAMBLE**

The purpose of this course is to understand the concepts of data communication and computer networks. Identify the components required to build different types of networks. Choose the required functionality at each layer for given application. Identify the solution for each functionality for each layer. Trace the flow of information from one node to another node in the network.

**PREREQUISITE**

**NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To provide basic knowledge in networking concepts. |
| 2 | To introduce and demonstrate various bridges, switches and Ethernet's. |
| 3 | To introduce different methodologies in routing. |
| 4 | To learn about transmission protocols and QOS. |
| 5 | To provide knowledge about different application protocols. |

**COURSE OUTCOMES**

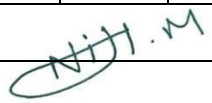
On successful completion of the course, students will be able to

| | |
|---|---|
| CO1.Learn the fundamentals of networks and different types of OSI Layers. | Remember and Understand |
| CO2.Learn the different Ethernet, wireless networks, switching and bridging concepts | Remember and Understand |
| CO3.Design solutions for complex routing methods and different multicast routing techniques. | Understand, Apply, analyse and evaluate |
| CO4.Learn the concepts of different protocols for transmission purpose and study the quality of service for TCP protocol. | Understand, Apply, analyse and evaluate |
| CO5.Learn different types of application protocols and its architecture. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | S | M | - | - | - | - | - | - | - | | | |
| CO2 | S | M | L | M | S | - | - | - | - | - | - | - | | | |
| CO3 | S | S | S | S | M | - | - | - | - | - | - | - | | | |
| CO4 | S | S | S | S | S | M | - | - | - | - | - | - | | | |
| CO5 | S | M | M | - | M | - | - | - | M | L | - | L | | | |

S- Strong; M-Medium; L-Low



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**SYLLABUS**

**FUNDAMENTALS & LINK LAYER**

Building a network – Requirements - Layering and protocols - Internet Architecture – Network software – Performance ; Link layer Services - Framing - Error Detection - Flow control.

**DATA-LINK LAYER & MEDIA ACCESS**

Introduction – Link-Layer Addressing – DLC Services – Data-Link Layer Protocols – HDLC – PPP – Media Access Control – Wired LANs: Ethernet – Wireless LANs – Introduction – IEEE 802.11, Bluetooth – Connecting Devices.

**NETWORK LAYER**

Network Layer Services – Packet switching – Performance – IPV4 Addresses – Forwarding of IP Packets – Network Layer Protocols: IP, ICMP v4 – Unicast Routing Algorithms – Protocols – Multicasting Basics – IPV6 Addressing – IPV6 Protocol.

**TRANSPORT LAYER**

Overview of Transport layer - UDP - Reliable byte stream (TCP) - Connection management - Flow control - Retransmission – TCP Congestion control - Congestion avoidance (DECbit, RED) – QoS – Application requirements.

**APPLICATION LAYER**

Traditional applications -Electronic Mail (SMTP, POP3, IMAP, MIME) – HTTP – Web Services – DNS – SNMP.

**LIST OF EXPERIMENTS.**

1. Implementation of Stop and Wait Protocol and Sliding Window Protocol.
2. Study of Socket Programming and Client – Server model
3. Write a code simulating ARP /RARP protocols.
4. Write a code simulating PING and TRACEROUTE commands
5. Study of Network simulator (NS) and Simulation of Congestion Control Algorithms using NS.
6. Simple Tcp/Ip Client Server Communication
7. UDP Echo Client Server Communication
8. Half Duplex Chat Using TCP/IP
9. Full Duplex Chat Using TCP/IP
10. Simulation of Distance Vector/ Link State Routing algorithm.
11. Performance evaluation of Routing protocols using Simulation tool.
12. Simulation of error correction code (like CRC).

**TEXT BOOKS:**


1. Behrouz A. Foruzan, “Data communication and Networking”, Seventh Edition, Tata McGraw-Hill, 2017.
2. Andrew S. Tannenbaum, David J. Wetherall “Computer Networks”, Pearson Education, Eighth Edition, 2016.


**REFERENCES:**


1. William Stallings, “Data and Computer Communication”, Eighth Edition, Pearson Education.
2. Knuth,D.E., “Computer Communication and Networks”, Sixth Edition , McGrath-Hill, 2016.


**COURSE DESIGNERS**


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| 35021C13 | SOFTWARE ENGINEERING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**

This course aims at introducing to the students about the product that is to be engineered and the process that provides a framework for the engineering technology. The course facilitates the students to analyze risk in software design and quality and to plan, design, develop and validate the software project.

**PREREQUISITE:**

NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To be aware of generic models to structure the software development process. |
| 2 | To understand fundamental concepts of requirements engineering and requirements specification. |
| 3 | To understand different notion of complexity at both the module and system level. |
| 4 | To be aware of some widely known design methods. |
| 5 | To understand the role and contents of testing activities in different life cycle phases. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Explain a process model for a software project Development. | Understand |
| CO2. Prepare the SRS, Life Cycle Models. | Apply |
| CO3. Apply Design document, Project plan of a given software system, Project Management and Requirement analysis, Principles to S/W project development. | Understand |
| CO4. Analyze the cost estimate and problem complexity using various estimation techniques. | Understand |
| CO5. Generate test cases using the techniques involved in selecting: (a) White Box testing (b) Block Box testing. | Apply |
| CO6. Explain the advantages of Design Process, configuration management and risk management activities | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | L | L | - | - | - | - | - | L | - | L | S | L | L |
| CO2 | S | S | M | - | - | M | M | L | - | L | - | - | S | L | L |
| CO3 | S | S | M | L | - | M | M | L | - | - | L | - | S | L | - |
| CO4 | S | S | M | L | L | L | M | M | M | M | L | L | S | S | - |
| CO5 | S | S | M | M | M | L | M | M | L | M | M | M | S | S | L |
| CO6 | S | S | L | - | - | L | M | L | - | - | - | L | S | L | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**SOFTWARE**

Introduction – The Evolving Role of Software– Software Characteristics– Software Applications– Software Engineering: A Layered Technology–S/W Engineering paradigm -SDLC– Software Process.

**LIFE CYCLE MODELS**

Linear Sequential Model- Prototyping Model-RAD Model-Evolutionary Software Process Models-Component Based Development - Project Planning Objectives – Software Scope – Resources – Software Project Estimation – Empirical Estimation Models – Make/Buy Decision-Functional and Non Functional requirements –software requirement specification (SRS) – Requirement Engineering process-Feasibility studies.

**ANALYSIS MODELING AND DESIGN CONCEPTS**

Data Modeling – Data Flow Diagrams – Behavioral Modeling – The Mechanics of Structured Analysis – The Data Dictionary – Software Design and Software Engineering – The Design Process – Design Principles – Design Concepts – Effective Modular Design – Design Heuristics for effective Modularity – The Design Model – Design Documentation.

**REQUIREMENT ENGINEERING TASKS**

Requirements Management, Structured coding Techniques-Coding Styles-Standards and Guidelines- Software testing Fundamentals-Types of testing - Quality Concepts – Quality Movement - Software Quality Assurance – Software Reviews — Formal Approaches to SQA - Software Reliability – ISO 9000 Quality Standards – SQA Plan.

**SOFTWARE CONFIGURATION MANAGEMENT**

Introduction about software configuration management – the SCM process –identification of objects in the software configuration – version control – change control – configuration audit – status reporting – SCM standards –software Documentation-seven rules for sound documentation..

**TEXT BOOKS:**


1. Roger S. Pressman, "Software Engineering – A practitioner's Approach", Seventh Edition, McGraw- Hill International Edition, 2010.
2. Ian sommerville ," Software Engineering ", Seventh Edition, Pearson Education Asia, 2017.
3. Mary Shaw, David Garlan,"Software Architecture- a perspectives on an Emerging Discipline


**REFERENCES:**


1. WattsS.Humphrey,"A Discipline for Software Engineering", Pearson Education, 2007.
2. James F.Peters and WitoldPedrycz,"Software Engineering, An Engineering Approach", Riley-India, 2007


**COURSE DESIGNERS**

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| 35021C16 | JAVA PROGRAMMING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course of study builds on the skills gained by students in Java Fundamentals and helps to advance Java programming skills. Students will design object-oriented applications with Java and will create Java programs using hands-on, engaging activities.

**PREREQUISITE : Nil**

**COURSEOBJECTIVES**

| | |
|---|---|
| 1 | Understand fundamentals of programming such as variables, conditional and iterativeexecution, methods, etc. |
| 2 | Understand fundamentals of object-oriented programming in Java, including defining classes, invoking methods, Using class libraries, etc. |
| 3 | Be aware of the important topics and principles of software development. |
| 4 | Understand Event Handling and Swing Components. |
| 5 | Understand Generic Programming. |

**COURSEOUTCOMES**

On successful completion of the course, students will be able to

| | |
|---|---|
| CO1.KnowledgeofthestructureandmodeloftheJavaprogramminglanguage | Knowledge |
| CO2.Use the Java programminglanguageforvariousprogrammingtechnologies | Understand |
| CO3.Develop software in the Java programming language | Apply |
| CO4.Evaluate user requirements for software functionality requied to decide whether the Java programming language can meet user requirements | Analyse |
| CO5.Choose an engineering approach to solving probles, Starting from the acquiredknowledge of programming and knowledge of operating systems. | Evaluation |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO 11 | PO 12 | PSO1 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | | | S | S | M | S | | | | S | S | |
| CO2 | S | | S | | S | | | S | L | L | | L | |
| CO3 | S | | M | L | S | M | | | | | L | L | |
| CO4 | S | | S | M | S | | S | | | | S | M | |
| CO5 | S | | S | M | S | | M | | | | S | M | |

S-Strong;M-Medium;L-Low

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**SYLLABUS**

**BASICSOFJAVA**

Object oriented programming concepts – objects – classes – methods and messages – abstraction and encapsulation – inheritance–abstract classes–polymorphism.-Objects and classes in Java–defining classes–methods-access specifiers–static members –constructors–finalize method.

**ARRAYS,OPERATORS,STRINGS&OBJECTS**

Arrays - Operators: Arithmetic Operators, The Bitwise Operators, Relational Operators, Boolean Logical Operators, The Assignment Operator, The ? Operator, Operator Precedence, Using Parentheses, Control Statements: Java's Selection Statements, Iteration Statements, Jump Statements–Strings-Packages–Java-Doc comments–-Inheritance–class hierarchy–polymorphism–dynamic binding–final keyword–abstract classes-The Object class–Reflection–interfaces–object cloning–inner classes–proxies.

**EVENTS&GRAPHICSPROGRAMMING**

I/Streams- Filter and pipe streams– Byte Code interpretation- Basics of event handling – event handlers– adapter classes–actions–mouse events–AWT event hierarchy–Graphics programming–Frame–Components–workingwith2Dshapes.

**SWING&GENERICPROGRAMMING, APPLETS**

Introduction to Swing – Model-View-Controller design pattern – buttons – layout management – Swing Components –exception handling – exception hierarchy – throwing and catching exceptions - Motivation for generic programming –generic classes–generic methods–genericcodeandvirtualmachine–inheritanceandgenerics–reflectionandgenerics.

Applets and HTML- Security Issues, Applets and Applications, passing parameters to applets. Creating a Swing Applet.

**THREADS&SOCKETPROGRAMMING**

Multi-threaded programming–interrupting threads–thread states–thread properties–thread synchronization–Executors–synchronizers–Socket Programming–UDP Datagram–Introduction to JavaBeans.

**TEXTBOOKS:**


1. CayS.HorstmannandGaryCornell,"CoreJava:VolumeI–Fundamentals",Ninth Edition, Sun MicrosystemsPress,2013.
2. ElliotteRustyHarold,"JavaNetworkProgramming",O"Reillypublishers,2000(UNITII).
3. EdRoman,"MasteringEnterpriseJavaBeans",JohnWiley&SonsInc.,1999(UNITIIIandUNITV).


**REFERENCES:**


1. K.ArnoldandJ.Gosling,"TheJAVAprogramminglanguage",Thirdedition,PearsonEducation,2008.
2. TimothyBudd,"Understanding Object-orientedprogrammingwithJava",UpdatedEdition,PearsonEducation,2000.
3. C.ThomasWu,"AnintroductiontoObject-orientedprogrammingwithJava",FourthEdition,TataMcGraw-HillPublishingcompanyLtd.,2006.


**COURSEDESIGNERS**

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|---|---|---|---|---|
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| 35021C20 | WEB TECHNOLOGY (THEORY AND PRACTICALS) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 2 | 4 |

**PREAMBLE:**

This course aims at introducing to the students about to provide the web concepts and enable the student to create simple Web based applications and to create an overview of 3-tier architecture and enable the student to create enterprise applications

**PREREQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To create simple Web pages and provide client side validation |
| 2 | To create dynamic web pages using server side scripting |
| 3 | To design and create user interfaces using JSP |
| 4 | To write the business logic for the middle tier |
| 5 | To provide transaction and security support for enterprise applications |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Explain the basic concepts of network and web page | Understand |
| CO2.Learn the concepts of scripting and developing the webpage. | Apply |
| CO3. Apply the concept of JSP . | Apply |
| CO4. Apply and develop the application using the concept of ASP | Apply, Analyze |
| CO5.Develop the web page by using all the application. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | M | - | - | - | - | - | L | L | M | M | M |
| CO2 | M | M | M | M | S | M | - | - | - | - | M | L | M | M | M |
| CO3 | M | M | S | S | S | M | - | - | - | - | M | L | S | M | M |
| CO4 | S | M | M | S | S | M | - | - | - | - | M | L | S | M | S |
| CO5 | S | M | M | S | M | M | - | - | - | - | M | L | M | M | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**UNIT I - INTRODUCTION TO NETWORKS AND WEB CONCEPTS**

History of the Internet and World Wide Web – Internet standards –URLs - CGI – HTML 4 protocols – HTTP, SMTP, POP3, MIME, and IMAP - Introduction to SGML – HTML – forms – frames – tables

**UNIT II- DYNAMIC HTML & JAVASCRIPT**

Dynamic HTML – introduction – cascading style sheets – JavaScript introduction – control structures – functions – arrays – objects – simple web applications, object model and collections – event model – filters and transition – data binding – data

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control.

**Exercise:** Home page Development static pages (using Only HTML) of an online Book store.

**UNIT III- DATABASE & XML**

Database Connectivity – JDBC Drivers – SQL Statements - XML – Structure in Data – Default Namespaces – DTD – XSD– Parsing XML.

**Exercise :** Programs using XML – Schema – XSLT/XSL.

**UNIT IV -ASP & Session Tracking**

ASP – Working of ASP – Objects – File System Objects – ADO – Access a Database from ASP – Server side Active-X Components – HTTP GET and POST requests – session tracking – cookies.

**Exercise:** Programs using DOM and SAX parsers.

**UNIT V- SERVLETS AND JSP**

Introduction – Servlet – Architecture – Lifecycle– Generic Servlet & HTTP Servlet - JSP – Overview – Objects – scripting – Standard Actions – Directives.

**Exercise :** implement the web applications using (a) Servlets and (b) JSP

**TEXT BOOKS:**

1. Deitel & Deitel, Goldberg, "Internet and World Wide Web – How to Program", Fifth edition, Pearson Education Asia, 2017.
2. Uttam K.Roy, "Web Technologies", OXFORD University Press – 2010

**REFERENCES:**

1. Behrouz A. Forouzan ,"TCP/IP Protocol Suite", Tata McGraw-Hill ,4th Edition,2010
2. Jeffrey C.Jackson, "Web Technologies–A Computer Science Perspective", Pearson Education, 2008.
3. Robert. W. Sebesta, "Programming the World Wide Web", Seventh Edition, Pearson Education, 2019.
4. R. Krishnamoorthy & S. Prabhu, "Internet and Java Programming", New Age International Publishers, 2004.
5. Thomno A. Powell, "The Complete Reference HTML and XHTML", fourth edition, Tata McGraw Hill, 2003.

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List of Programs

1. Creation of HTML pages with frames, links, tables and other tags
2. Usage of internal and external CSS along with HTML pages
3. Client side Programming

# Java script for displaying date and comparing two dates

# Form Validation including text field, radio buttons, check boxes, list box and other controls

4. Usage of ASP/JSP objects response, Request, Application, Session, Server, ADO etc

# Writing online applications such as shopping, railway/air/bus ticket reservation system with set of ASP/JSP pages

# Using sessions and cookies as part of the web application

5. Writing Servlet Program using HTTP Servlet
6. Any online application with database access
7. Creation of XML document for a specific domain
8. Writing DTD or XML schema for the domain specific XML document
9. Parsing an XML document using DOM and SAX Parsers
10. Sample web application development in the open source environment

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Email Id |
|---|---|---|---|---|
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| 35121C04 | HIGH SPEED NETWORKS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

The purpose of this course is to understand the concepts of data communication and computer networks. Identify the components required to build different types of networks. Choose the required functionality at each layer for given application. Identify the solution for each functionality for each layer. Trace the flow of information from one node to another node in the network.

**PREREQUISITE**

**NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To provide basic knowledge in networking concepts. |
| 2 | To introduce and demonstrate various bridges, switches and Ethernet's. |
| 3 | To introduce different methodologies in routing. |
| 4 | To learn about transmission protocols and QOS. |
| 5 | To provide knowledge about different application protocols. |

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| | |
|---|---|
| CO1.Learn the fundamentals of networks and different types of OSI Layers. | Remember and Understand |
| CO2.Learn the different Ethernet, wireless networks, switching and bridging concepts | Remember and Understand |
| CO3.Design solutions for complex routing methods and different multicast routing techniques. | Understand, Apply, analyse and evaluate |
| CO4.Learn the concepts of different protocols for transmission purpose and study the quality of service for TCP protocol. | Understand, Apply, analyse and evaluate |
| CO5.Learn different types of application protocols and its architecture. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | S | M | - | - | - | - | - | - | - | | | |
| CO2 | S | M | L | M | S | - | - | - | - | - | - | - | | | |
| CO3 | S | S | S | S | M | - | - | - | - | - | - | - | | | |
| CO4 | S | S | S | S | S | M | - | - | - | - | - | - | | | |
| CO5 | S | M | M | - | M | - | - | - | M | L | - | L | | | |

S- Strong; M-Medium; L-Low

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**UNIT I HIGH SPEED NETWORKS 9**

Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM Logical Connection, ATM Cell – ATM Service Categories – AAL, High Speed LANs: Fast Ethernet, Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements – Architecture of 802.11

**UNIT II CONGESTION AND TRAFFIC MANAGEMENT** 8

Queuing Analysis- Queuing Models – Single Server Queues – Effects of Congestion – Congestion Control – Traffic Management – Congestion Control in Packet Switching Networks – Frame Relay Congestion Control.

**UNIT III TCP AND ATM CONGESTION CONTROL 11**

TCP Flow control – TCP Congestion Control – Re transmission – Timer Management – Exponential RTO back off – KARN's Algorithm – Window management – Performance of TCP over ATM. Traffic and Congestion control in ATM – Requirements – Attributes Traffic Management Frame work, Traffic Control – ABR traffic Management – ABR rate control, RM cell formats, ABR Capacity allocations – GFR traffic management.

**UNIT IV INTEGRATED AND DIFFERENTIATED SERVICES 8**

Integrated Services Architecture – Approach, Components, Services- Queuing Discipline, FQ,PS, BRFQ, GPS, WFQ – Random Early Detection, Differentiated Services

**UNIT V PROTOCOLS FOR QOS SUPPORT 9**

RSVP – Goals & Characteristics, Data Flow, RSVP operations, Protocol Mechanisms – Multi protocol Label Switching – Operations, Label Stacking, Protocol details – RTP – Protocol
Architecture, Data Transfer Protocol, RTCP.

TEXT BOOK

1. William Stallings, "High Speed Networks and Interne", Pearson Education, Second Edition, 2002.

REFERENCES

1. Warland, Pravin Varaiya, "High performance communication networks", Second Edition, Jean Harcourt Asia Pvt. Ltd., 2001.
2. Irvan Pepelnjk, Jim Guichard, Jeff Apcar, "MPLS and VPN architecture", Cisco Press,Volume 1 and 2, 2003.
3. Abhijit S. Pandya, Ercan Sea, "ATM Technology for Broad Band TelecommunicationNetworks", CRC Press, New York, 2004.

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Email Id |
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| 35921C06 | INTERNET OF THINGS AND ITS APPLICATIONS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

To study and understand the technologies involved in Internet of Things (IoT) and apply them practically.

**PREREQUISITE :NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To understand the basic concepts of IOT |
| **2.** | To study the methodology of IOT |
| **3.** | To Develop IOT applications using Raspberry PI |
| **4.** | To Develop IOT applications using Arduino and Intel Edison |
| **5.** | To apply cloud concepts in IOT |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Able to understand basics in IOT | Understand |
| **CO2:** Able to understand Methodology in IOT | Apply |
| **CO3:** Able to design IOT applications using Raspberry | Analyze |
| **CO4**: Able to design IOT applications using Aurdino and Intel Edison | Analyze |
| CO5: Able to apply Cloud computing in IOT | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO2 | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO3 | M | M | S | M | - | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| | | | | | | | | | | | | | | | |

**S- Strong; M-Medium; L-Low**

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| SYLLABUS<br>INTRODUCTION |
|---|
| Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M. |
| **IOT METHODOLOGY** |
| IoT systems management – IoT Design Methodology – Specifications Integration and Application Development. |
| **IOT WITH RASPBERRY** |
| Bascis of Raspberry PI, Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services |
| **IOT WITH AURDINO AND INTEL EDISON** |
| Basics of Aurdino, Intel Edison with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks |
| **APPLICATIONS** |
| Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for Iot – Data Analytics for IoT – Software & Management Tools for IoT. |
| **TEXT BOOKS** |
| **1.** Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015.<br>**2.** Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014. |
| **REFERENCES** |
| 1. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014 |

**COURSE DESIGNERS**

| S. No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| **1.** | Dr.R.Jaichandran | Assistant professor G-II | CSE | rjaichandran@avit.ac.in |
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| 35121C02 | CYBER SECURITY PRINCIPALS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course provides basic knowledge on Cyber security concepts. Students able to understand different types of malwares and security to be followed in evolving technologies

**PREREQUISITE :** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To understand the fundamentals of cryptography |
| **2.** | To understand network security concepts |
| **3.** | To understand different types of malwares |
| **4.** | To learn applying security in evolving technologies |
| **5.** | To learn about cyber laws and Forensics |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Able to understand basics concepts in cryptography | Understand |
| CO2: Able to understand and apply network security concepts | Understand and Apply |
| CO3: Able to prevent different types of malwares | Apply |
| CO4: Able to apply security concepts in emerging technologies | Analyze and Apply |
| CO5: Able to investigate cyber crimes | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO2** | M | M | M | M | M | - | - | - | - | - | - | - | M | M | M |
| **CO3** | M | M | S | M | M | - | - | - | - | - | - | - | M | M | M |
| **CO4** | S | M | M | M | | - | - | - | - | - | - | - | M | M | S |
| **CO5** | S | M | M | M | S | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

**SYLLABUS:**

**UNIT I- INTRODUCTION TO CRYPTOGRAPHY**

Introduction to Cryptography, Symmetric key Cryptography, Asymmetric key, Message, Authentication, Hash Function, Digital Signatures, Firewalls- Types of Firewalls, Security Protocols.

**UNIT II – NETWORK SECURITY**

Network packet Sniffing, DOS/ DDOS attacks, Vulnerabilities and Attacks, Intrusion detection and Prevention Techniques, Host based Intrusion prevention Systems,

**UNIT III - MALWARES**

Types of Malware: Virus, Worms, Trojans, Rootkits, Robots, Adware's,Spywares, Ransom wares, Zombies, Honey pots, etc.

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**UNIT IV – SECURITY IN EVOLVING TECHNOLOGIES**

Biometrics, Mobile Computing and Hardening on android and ios, IOT Security, Web server configuration and Security, Basic security for HTTP Applications and Web Services like SOAP, REST etc., Identity Management and Web Services, Authorization Patterns, Security Considerations, Challenges.

**UNIT V - CYBER LAWS & FORENSICS**

Cyber Security Regulations, Roles of International Law, Cyber Security Standards,National Cyber Security Policy 2013. Introduction to Cyber Forensics, Need of Cyber Forensics, Cyber Evidence,Documentation and Management of Crime Sense,National Cyber Security Policy 2013. Introduction to Cyber Forensics, Need of Cyber Forensics, Cyber Evidence,Documentation and Management of Crime Sense.

**TEXT BOOKS**

1. William Stallings, “Cryptography and Network Security”, 8 th Edition Pearson Education/PHI, 2020.

2. V.K. Jain, “Cryptography and Network Security”, 1 st edition Khanna Publishing House, 2020.

**Referances:**

3. Gupta Sarika, “Information and Cyber Security”, Khanna Publishing House, Delhi.

4. Atul Kahate “Cryptography and Network Security” | 4th Edition Paperback – 8 May 2019

5. V.K. Pachghare, “Cryptography and Information Security”, PHI Learning

6. Nina Godbole, “Information System Security”, Wiley

7. Bothra Harsh, “Hacking”, Khanna Publishing House, Delhi..

8. James Graham, Richard Howard and Ryan Olson, “Cyber Security Essentials”, CRC Press, Taylor & Francis Group, 2011.

9.. By Dan Shoemaker, Ph.D., William Arthur Conklin, Wm Arthur Conklin, “Cyber security: The Essential Body of Knowledge”, Cengage Learning, 2012.

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| 35121C05 | IT INFRASTRUCTURE AND MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

The proposed course exposes the students to understand the features of different technologies involved in IT infrastructure and management.

**PREREQUISITE**

NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand the basics of IT infrastructure |
| 2 | To understand the current computing techniques in IT fields |
| 3 | To explore the business models |
| 4 | To understand the different security management and storage management in IT infrastructure |
| 5 | To understand the service delivery concept in IT field |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand the basics of IT infrastructure | Understand |
| **CO2:** Understand the current computing techniques in IT fields | Understand |
| **CO3:** Explore the business models | Apply |
| **CO4:** Apply the different security management and storage management in IT infrastructure | Apply |
| **CO5:** Understand the service delivery concept in IT field | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | - | - | M | S | - | - | - | - | - | M | S | S |
| **CO2** | S | - | S | - | M | S | - | - | - | - | - | M | M | - |
| **CO3** | S | M | S | - | M | S | - | - | - | - | - | M | S | S |
| **CO4** | S | L | S | M | M | M | - | - | - | - | - | S | M | - |
| **CO5** | S | S | S | M | M | M | - | - | - | - | - | M | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**IT system Management**

Common tasks in IT system management, approaches for organization Management, Models in IT system design, IT management systems context diagram, patterns for IT system Management.

**IT Infrastructure Management**

Factors to consider in designing IT organizations and IT infrastructure, Determining customer's Requirements, Identifying System Components to manage, Exist Processes, Data, applications, Tools and their integration, Patterns for IT systems management, Introduction to the design process for information systems, Models, Information Technology Infrastructure Library (ITIL).

**Establishing business value of information system**

Information system costs and benefits, Capital budgeting for information system, Real Options pricing models, Limitation of financial models.

**Service Delivery and Service Support Management**

Service-level management, financial management and advantages of financial management -Service support process, Configuration Management-Incident management.

**Storage Management and Security Management**

Types of Storage management, Benefits of storage management, backups, Archive, Recovery, Disaster recovery-Introduction Security, Identity management, Single sign-on, Access Management.

**TEXT BOOKS**

1. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw- Hill, New York, 2006.
2. J. Parkin and D. Sharma, Infrastructure planning, Thomas Telford, London, 1999

**REFERENCES**

1. P. Chandra, Projects: Planning, analysis, selection, financing, implementation, and review, Tata McGraw-Hill, New Delhi, 2009.
2. J. D. Finnerty, Project financing - Asset-based financial engineering, John Wiley & Sons, New York, 1996.
3. A. S. Goodman and M. Hastak, Infrastructure planning handbook: Planning, engineering, and economics, McGraw-Hill, New York, 2006.

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| 35021C83 | DATABASE MANAGEMENT SYSTEMS LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 0 | 0 | 4 | 2 |

**PREAMBLE**

This course aims at facilitating the student to apply the effective designing of relational database for real-world applications, perform many operations related to creating, manipulating and maintaining databases using DBMS tools and manipulate data using other languages through ODBC and JDBC.

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To demonstrate the basic fundamentals of Structured Query Language (SQL). |
| 2. | To employ the conceptual and relational models to design large database systems. |
| 3. | To design and build database system for a given real world problems |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | | |
|---|---|---|
| CO1 | On the successful completion of the course, students will be able to Build and manipulate relational databases using simple and complex queries in Structured Query Language. | Apply |
| CO2 | Develop normalized and demoralized databases for a given application using various constraints like integrity and value constraints. | Apply |
| CO3 | Construct and make use of database objects such as indices, sequences, synonyms using Structured Query Language. | Analysis |
| CO4 | Develop objects using PL/SQL and manipulate databases through these objects | Analysis |
| CO5 | Construct and make use of composite data types using PL/SQL (CO5) Develop a complete database application in a high level language using Java Database Connectivity. | Analysis |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | | | | | | | M | M |
| CO2 | M | M | M | M | | | | | | | M | M |
| CO3 | M | M | M | M | | | | | | | M | M |
| CO4 | S | M | M | M | | | | | | | M | S |
| CO5 | S | M | M | M | | | | | | | M | S |

S- Strong; M-Medium; L-Low

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**LIST OF EXPERIMENTS**

1. To write a query in Data Definition Language (DDL) commands in DBMS
2. To write a query in Data Manipulation Language (DML) commands in DBMS
3. To write a query in Data Control Language (DCL) and Transfer Control Language (TCL) Commands in DBMS
4. To write a query in Inbuilt functions of SQL in DBMS
5. To write a query in Join operations and Set operations in DBMS
6. To write a query to illustrate the creation of Cursor
7. To write a query to illustrate the creation of Triggers
8. To write a query to illustrate the creation of Procedures and Functions
9. To write a query for Database design using Normalization functions
10. To design and implementation of a database application for Payroll Management System
11. To design and implementation of a database application for Report Generation
12. To design and implementation of a database application for Student Management System

**References:**


1. Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", Fourth Edition, Tata McGraw Hill, 2012.
2. Ramez Elmasri, Shamkant B. Navathe, "Fundamentals of Database Systems", Fourth Edition, Addision weskey, 2002.
3. Raghu Ramakrishnan, "Database Management Systems", Third Edition, McGraw Hill, 2002.
4. Peter Rob and Corlos Coronel, "Database Systems – Design, Implementation and Management, Fifth Edition, Thompson Learning, Course Technology, 2003.


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| 35021C84 | OBJECT ORIENTED PROGRAMMING LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 0 | 0 | 4 | 2 |

**PREAMBLE**

With a dynamic learn-by-doing focus, this laboratory course encourages students to understand the use of object oriented way of problem solving. This course challenges students to exercise their creativity in both programming and analysis.

**PRERQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To be capable of explaining procedure as well as object oriented programming concepts & their differences. |
| **2.** | To be able to implement inline and friend function very well. |
| **3.** | To be familiar with how to make programs using function overloading & operator overloading |
| **4.** | To get the capability to implement the different types of inheritance & done problems related to them |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Construct object-oriented programs for a given scenario using the concepts of abstraction, encapsulation, message-passing and modularity. | Analysis |
| **CO2.** Develop object-oriented programs for a given application using the concepts of compile-time and run-time polymorphism. | Apply |
| **CO3.** Construct object-oriented programs for a given application by demonstrating the inter-relationship between classes using inheritance and aggregation. | Apply |
| **CO4.** Develop object-oriented applications that can handle exceptions.. | Apply |
| **CO5.** Construct object-oriented applications for a given scenario to persist data using files and object-serialization. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO1 0 | PO1 1 | PO1 2 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | S | - | - | - | - | - | - | - | M | M | M |
| CO2 | M | M | M | M | M | - | - | - | - | - | - | - | M | M | M |
| CO3 | M | M | S | M | S | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | M | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | M | M | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

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**LIST OF EXPERIMENTS**

1. Write a program to illustrate function overloading feature
2. Write a program to illustrate the overloading of various operators Ex. Binary operators, Unary operators, New and Delete operators.
3. Write a program to illustrate the use of following functions: a) Friend functions b) Inline functions c) Static Member functions d) Function with default arguments
4. Write a program to illustrate the use of destructor and the various types of constructors (no arguments, constructor, constructor with arguments, copy constructor etc).
5. Write a program to illustrate the various forms of inheritance: Ex. Single, Multiple, multilevel, hierarchical inheritance etc.
6. Write a program having student as on abstract class and create many derived classes such as Engg. Science, Medical, etc. from student's class. Create their objects and process them.
7. Write a program to illustrate the use of virtual functions.
8. Write a program to illustrate the use of virtual base class.
9. Write a program to illustrate file handling operations: Ex. a) Copying a text files b) Displaying the contents of the file etc.
10. Write a program to illustrate how exceptions are handled (ex: division-by-zero, overflow and underflow in stack etc).

**REFERENCES:**


**1.** H.M. Deitel and P.J. Deitel, C How to program Introducing C++ and Java, Fourth Edition, Pearson Prentice Hall, 2010.
**2.** B. Stroustrup, "The C++ Programming language", Third edition, Pearson Education, 2004.
**3.** B. Trivedi, "Programming with ANSI C++", Oxford University Press, 2007.
**4.** K. R. Venugopal, Rajkumar, T. Ra vishankar, Mastering C++, 4th Edition, Tata McGraw 2. Hill, 2008.
**5.** Budd T., An Introduction to Object-oriented Programming, Addison-Wesley 3rd 4. edition, 2008.
**6.** Bjarne stroustrup, The C++ programming Language, Addison Wesley, 3rd edition2008.
**7.** Harvey M. Deitel and Paul J. Deitel, C++ How to Program, 7th edition, Prentice Hall, 2010.
**8.** Tony Gaddis, Starting Out with Java: From Control Structures through Objects, 4/E, Addison-Wesley, 2009.


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| 35021C88 | JAVA PROGRAMMING LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 0 | 0 | 4 | 2 |

**PREAMBLE**

The goal of this course is to provide students with the ability to write programs in Java and apply concepts described in the Object-Oriented Programming course. The course is designed to accommodate students with diverse programming backgrounds, consequently Java is taught from first principles in a practical class setting were students can work at their own pace from a course handbook. Each practical class will culminate in an assessed exercise.

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | Gain knowledge about basic Java language syntax and semantics to write Java programs and use concepts such as variables, conditional and iterative execution methods etc. |
| **2.** | Understand the fundamentals of object-oriented programming in Java, including defining classes, objects, invoking methods etc and exception handling mechanisms. |
| **3.** | Understand the principles of inheritance, packages and interfaces. |

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Create Java programs that solve simple business problems. | Apply |
| **CO2.** Validate user input. | Apply |
| **CO3.** Construct a Java class based on a UML class diagram. | Apply |
| **CO4.** Perform a test plan to validate a Java program. | Apply |
| **CO5.** Document a Java program. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | S | - | - | - | - | - | - | - | M | M | M |
| CO2 | M | M | M | M | S | - | - | - | - | - | - | - | M | M | M |
| CO3 | M | M | S | M | S | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | S | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | M | M | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

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**LIST OF EXPERIMENTS.**

1. Write a JAVA program to search the largest element from the given array.
2. Write a JAVA program to sort the strings in an alphabetical order.
3. Write a JAVA program to extract a portion of a character string and to print the extracted portion and the remaining portion of the string. Assume that m characters are extracted, starting with the nth character.
4. Write a JAVA program for illustrating overloading and overriding methods in JAVA.
5. Write a JAVA program which illustrates the implementation of multiple inheritance using interfaces in JAVA.
6. Write a JAVA program to create your package for basic mathematical operations such as add, subtract, multiply. Demonstrate the use of this package in another class.
7. Write a JAVA program that counts the number of digits in a given number. If an alphabet is entered instead of a number, the program should not terminate. Instead it should display appropriate error message. (Exception Handling).
8. Write a JAVA program to move the text "JAVA PROGRAMMING LAB" diagonally using Applet.
9. Write a JAVA program to create an Applet with a label "Do you know car driving?" and two buttons Yes, NO.
   When the user clicks "Yes" button, the message "Congrats" must be displayed. When the user clicks "NO "button, "Regrets" must be displayed.
10. Write a JAVA program to animate the face image using Applet.
11. Write a JAVA program to create four Text fields for the name, street, city and pin code with suitable Labels. Also add a button called "My Details". When you click the button, your name, street, city, and pin code must appear in the Text fields.

**References:**


1. TimothyBudd,"Understanding Object-orientedprogrammingwithJava",UpdatedEdition,PearsonEducation,2000.
2. Java Lab Manual by Asif Munir - November 2018


**COURSE DESIGNERS**

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| 35021C82 | DATA STRUCTURES LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 0 | 0 | 4 | 2 |

**PREAMBLE**

This laboratory enables the students clearly understand the concepts of data structures. Also students can implement the searching and sorting algorithms.

**PRERQUISITE**

**NIL**

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1**. Develop algorithms for the concepts of data structures. | Apply |
| **CO2.** Able to Apply searching and sorting techniques | Apply |
| **CO3.** Construct implementations for Abstract Data Types (ADT) using appropriate Data Structures | Apply |
| **CO4.** Assess the suitability of a data structure to solve a problem, based on the time and space complexities of different operations on the data structure | Analyze |
| **CO5.** Implement algorithms which use sorting, searching and/or selection as sub-procedures.(CO5) | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO2** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO3** | M | M | S | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO4** | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| **CO5** | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

**LIST OF EXPERIMENTS:**

1. Exercises using Objects, Classes, Inheritance
2. Operator Overloading and Polymorphism
3. Array implementation of List Abstract Data Type (ADT)
4. Linked list implementation of List ADT
5. Cursor implementation of List ADT
6. Array implementations of Stack ADT
7. Linked list implementations of Stack ADT
8. Queue ADT
9. Search Tree ADT - Binary Search Tree

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**10.** Heap Sort
**11.** Quick Sort

**REFERENCES:**


1. Laboratory Reference Manual.
2. Balaguruswami. E, "Programming in C", TMH Publications, 1997
3. Gottfried, "Programming with C", schaums outline series, TMH publications, 1997.
4. Mahapatra , "Thinking in C", PHI publications, 2nd Edition, 1998.
5. Subbura.R , "Programming in C", Vikas publishing, 1st Edition, 2000.


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| 35021C07 | ARTIFICIAL INTELLIGENCE | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enable them to lean about Artificial Intelligence. This syllabus contains intelligent agent, Knowledge Representation and Machine learning, and application. Which is useful to how represent knowledge and in machine learning contain some important prediction method. Thus, this syllabus focuses on to know about AI and its concepts, application.

**PREREQUISITE :Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To identify the kind of problems that can be solved using AI technique: to know the relation between AI and other areas of computer science. |
| 2. | To have knowledge of generic problem-solving methods in AI.. |
| 3. | TO Design software agents to solve a problem. |
| 4. | Apply the knowledge of algorithms to solve arithmetic problems. |
| 5. | Assemble an efficient code for engineering problems. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:**. Identify the different agent and its types to solve the problems | Understand |
| **CO2:** know about the problem solving technique in Artificial Intelligence. | Apply |
| **CO3:** Construct the normal form and represent the knowledge. | Apply |
| **CO4**: to know about extension of condition probability and how to apply in the real time environment. | Apply |
| **CO5:** to lean about Information Retrieval and Speech Recognition | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | M | | L | | | | | L | L | L | **L** | | |
| **CO2** | M | M | L | L | L | | | | | M | | L | | L | S |
| **CO3** | M | M | L | L | | M | | | | L | | | | M | |
| **CO4** | M | S | L | | | L | | | | L | | M | **M** | | M |
| **CO5** | M | L | | | | M | | | | M | M | L | **S** | | |

S- Strong; M-Medium; L-Low

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| UNIT - I | INTRODUCTION |
|---|---|
| Introduction-Definition-History of Artificial Intelligence-Intelligent Agents-Types Of Agents- simplex reflex agent, model based agent, utilized based agent, learning agent, agent environments. | |
| **UNIT - II** | **PROBLEM SOLVING** |
| Problem Solving Methods-Search Strategies-Uninformed Search Strategies-Comparison of Uninformed Search Algorithms-Informed Search Strategies-Local Search Algorithms-Searching With Partial Information-Constraint Satisfaction Problem | |
| **UNIT - III** | **KNOWLEDGE REPRESENTATION** |
| Propositional Logic-First Order Predicate Logic-Prolog Programming-Unification-Forward Chaining-Backward Chaining-Ontological Engineering-Categories and Objects-Events-Mental Events and Mental Objects. | |
| **UNIT - IV** | **MACHINE LEARNING** |
| Conditional Probability-Joint probability, Prior Probability- Bayes Rule and Its Applications-Bayesian Networks-Inferences in Bayesian Networks- Morkov chain, Hidden Markov Models- Learning from Observation-Supervised Learning. | |
| **UNIT - V** | **APPLICATION** |
| AI Applications-Language Models-Information Retrieval-Information Extraction-Natural Language Processing-Machine Translation-Speech Recognition | |

**TEXT BOOKS**

1. S. Russell and P. Norvig, "Artificial Intelligence – A Modern Approach", Fourth Edition, Pearson Education, 2020
2. Bratko, I., Prolog Programming For Artificial Intelligence (International Computer Science Series), Addison-Wesley Educational Publishers Inc; 4th Edition, 2012..

**REFERENCES**


1. David Poole, Alan Mackworth, Randy Goebel,"Computational Intelligence: A Logical Approach", Oxford University Press, 2004.
2. G. Luger, "Artificial Intelligence: Structures and Strategies For Complex Problem Solving", Sixth Edition, Pearson Education, 2009.
3. J. Nilsson, "Artificial Intelligence: A New Synthesis", Elsevier Publishers, 2011.


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| 35021C85 | ARTIFICIAL INTELLIGENCE LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 0 | 0 | 4 | 2 |

**PREAMBLE**

To gain programming knowledge in Artificial Intelligence

**PREREQUISITE :Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| **2.** | Artificial Intelligence is the terms of computer science. |
| **3.** | AI is the learning in which machine can learn by its own without being explicitly programmed. It is an application of AI that provide system the ability to automatically learn and improve from experience. |
| **4.** | AI is the learning in which machine can learn by its own without being explicitly programmed. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Implement breadth first, depth first and best first search technique for problems like 8-puzzle,8-queens,Travelling salesperson and water jug problems etc. | Apply |
| CO2. Implement hill climbing, A* algorithm and randomized search techniques for gaming applications. | Apply |
| CO3. Apply Apply Develop the solutions for combinatorial problems using intelligent optimization algorithms like Simulated Annealing, Genetic Algorithm, Particle Swarm Optimization. | Apply |
| CO4. Construct rule based systems for any application using logic programming language. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO 1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1.** | S | S | M | L | | | | | | | | | | | M |
| **CO2.** | S | S | M | M | L | | | | | | | | | | M |
| **CO3.** | S | S | M | L | | | | | | | | | | | M |
| **CO4.** | S | S | M | L | | | | | | | | | | | M |

S- Strong; M-Medium; L-Low

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SYLLABUS

LIST OF EXPERIMENTS:

1. Implement Breadth First Search ( for 8 puzzle problem or Water jug problem or any AI search problem)
2. Implement Depth First Search ( for 8-queen problem or 8 puzzle problem or Water jug problem or any AI search problem)
3. Solve travelling salesperson problem using Best First Search
4. Implement Hill climbing algorithm
5. Apply any one randomized search technique (Simulated annealing, Genetic Algorithms, Particle swarm optimization) for solving problems like, TSP, Graph coloring, Vertex cover problem, shortest path problems, etc.
6. Write a program to generate the output for A* algorithm.
7. Write a program to show the Tic Tac Toe game for 0 and X
8. Solve the crossword puzzle problem as constraint satisfaction problem
9. Implement anyone Propositional calculus related problem
10. Develop any rule based system for an application of your choice.
11. Generate, view and access decision tree and rules.
12. Implement a k-means clustering algorithm for any given data set.

TEXT BOOKS

1. S. Russell and P. Norvig, "Artificial Intelligence – A Modern Approach", Second Edition, Pearson Education, 2015

Bratko, I., Prolog Programming For Artificial Intelligence (International Computer Science Series), Addison-Wesley Educational Publishers Inc; 4th Edition, 2011..

REFERENCES

1. David Poole, Alan Mackworth, Randy Goebel,"Computational Intelligence: A Logical Approach", Oxford University Press, 2004.

2. G. Luger, "Artificial Intelligence: Structures and Strategies For Complex Problem Solving", Fourth Edition, Pearson Education, 2002.

3. J. Nilsson, "Artificial Intelligence: A New Synthesis", Elsevier Publishers, 1998.

COURSE DESIGNERS

| S. No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1. | Dr.S.Rajaprakash | Associate professor | CSE | rajaprakash@avit.ac.in. |
| 2. | Dr.Nithya | Professor | CSE | Nithya@vmkv.ac.in |

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| 35921C05 | FOUNDATIONS OF DATA SCIENCE | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE**

Data Science is about drawing useful conclusions from large and diverse data sets through exploration, prediction, and inference. Exploration involves identifying patterns in information. Prediction involves using information we know to make informed guesses about values we wish we knew. Inference involves quantifying our degree of certainty. The primary tools for exploration are visualizations and descriptive statistics, for prediction are machine learning and optimization, and for inference are statistical tests and models.Through under standing a particular domain, the students learn to ask appropriate questions about their data and correctly interpret the answers provided by inferential and computational tools

**PREREQUISITE**

NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To obtain a Comprehensive knowledge of various tools and techniques for Data transformation and visualization |
| **2.** | To learn the probability and probabilistic models of data science |
| **3.** | To learn the basic statistics and testing hypothesis for specific problems |
| **4.** | To learn about the prediction models |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand how to apply pre-processing techniques to convert raw data so as to ena further analysis | Understand |
| **CO2: U**nderstand and apply exploratory data analysis and create insightful visualizations to identify patterns | Understand |
| **CO3: U**nderstand how to derive the probability density function of transformations of random variables and use these techniques to generate data from various distributions | Understand |
| **CO4**: Understand the statistical foundations of data science and analyze the degree of certainty of predictions using statistical test and models | Understand |
| **CO5:** Familiarize with machine learning algorithms for prediction and to derive insights | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | - | - | M | - | - | - | - | - | - | - | M | M |
| **CO2** | S | M | M | M | - | - | - | - | - | - | - | M | M |
| **CO3** | S | - | - | - | - | - | - | - | - | - | - | M | M |
| **CO4** | S | M | M | M | - | - | - | - | - | - | - | M | M |
| **CO5** | S | M | M | - | - | - | - | - | - | - | - | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**:

Data Science, Big Data and Data Science – Datafication - Current landscape of perspectives - Skill sets needed; Matrices - Matrices to represent relations between data, and necessary linear algebraic operations on matrices - Approximately representing matrices by decomposition's (SVD and PCA); Statistics: Descriptive Statistics: distributions and probability - Statistical Inference: Populations and samples - Statistical modeling - probability distributions - fitting a model - Hypothesis Testing - Intro to R/ Python.

**DATA PREPROCESSING:**

Data cleaning - data integration - Data Reduction Data Transformation and Data Discretization.Evaluation of classification methods – Confusion matrix, Students T-tests and ROC curves-Exploratory Data Analysis - Basic tools (plots, graphs and summary statistics) of EDA, Philosophy of EDA - The Data Science Process.

**BASIC MACHINE LEARNING ALGORITHMS:**

Association Rule mining - Linear Regression- Logistic Regression - Classifiers - k-Nearest Neighbors (k-NN), k-means -Decision tree - Naive Bayes- Ensemble Methods - Random Forest. Feature Generation and Feature Selection - Feature Selection algorithms - Filters; Wrappers; Decision Trees; Random Forests.

**CLUSTERING**:

Choosing distance metrics - Different clustering approaches - hierarchical agglomerative clustering, k-means (Lloyd's algorithm), - DBSCAN - Relative merits of each method - clustering tendency and quality.

**DATA VISUALIZATION:**

Basic principles, ideas and tools for data visualization.

**REFERENCE BOOKS**


1. Cathy O'Neil and Rachel Schutt, " Doing Data Science, Straight Talk From The Frontline", O'Reilly, 2014.
2. Jiawei Han, Micheline Kamber and Jian Pei, " Data Mining: Concepts and Techniques", Third Edition. ISBN 0123814790, 2011.
3. Mohammed J. Zaki and Wagner Miera Jr, "Data Mining and Analysis: Fundamental Concepts and Algorithms", Cambridge University Press, 2014.
4. Matt Harrison, "Learning the Pandas Library: Python Tools for Data Munging, Analysis, and Visualization , O'Reilly, 2016.
5. Joel Grus, "Data Science from Scratch: First Principles with Python", O'Reilly Media, 2015.
6. Wes McKinney, "Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython", O'Reilly Media, 2012


**COURSE DESIGNERS**

| S. No. | Name of the Faculty | Designation | Department / Name of the College | Mail ID |
|---|---|---|---|---|
| 1. | Dr.S.Rajaprakash | Associate Professor | CSE / AVIT | rajaprakash@avit.ac.in |
| 2. | Mrs. T. Narmadha | Assistant Professor | CSE / VMKVEC | narmadha@vmkvec.edu.in |

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| 35021C89 | PYTHON FOR DATA SCIENCE LAB | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 0 | 0 | 4 | 2 |

**LIST OF EXPERIMENTS:**

1. Editing and executing Programs involving Flow Controls.
2. Editing and executing Programs involving Functions.
3. Program in String Manipulations
4. Creating and manipulating a Tuple
5. Creating and manipulating a List
6. Creating and manipulating a Dictionary
7. Object Creation and Usage
8. Program involving Inheritance
9. Program involving Overloading
10. Reading and Writing with Text Files and Binary Files
11. Combining and Merging Data Sets
12. Program involving Regular Expressions
13. Data Aggregation and GroupWise Operations

**References:**


1. Gowrishanker and Veena, "Introduction to Python Programming", CRC Press,2019.
2. Python Crash Course, 2nd Edition, By Eric Matthes, May 2019
3. NumPy Essentials, By Leo Chin and Tanmay Dutta, April 2016
4. Joel Grus, "Data Science from scratch", O'Reilly, 2015.
5. Wes Mc Kinney, "Python for Data Analysis", O'Reilly Media, 2012.
6. Kenneth A. Lambert, (2011), "The Fundamentals of Python: First Programs",Cengage Learnin
7. Jake Vanderplas. Python Data Science Handbook: Essential Tools forWorking with Data 1st Edition


**COURSE DESIGNERS**


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| 2. | Senthamilsevi.G | Associate Professor | CSE / VMKVEC | senthamilselvi@vmkvec.edu.in |


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| 35121C06 | WEB ESSENTIALS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**

This course aims at introducing to the students about to provide the web concepts and enable the student to create simple Web based applications and to create an overview of 3-tier architecture and enable the student to create enterprise applications

**PREREQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To create simple Web pages and provide client side validation |
| 2 | To understand the concepts and architecture of the World Wide Web. |
| 3 | To understand and practice embedded dynamic scripting on client side Internet Programming |
| 4 | To understand and practice web development techniques on client-side |
| 5 | To create dynamic web pages using server side scripting and understand and practice mark up languages |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1 : Acquire knowledge about functionalities of world wide web | Understand |
| CO2 : Explore markup languages features and create interactive web pages using them | Apply |
| CO3 : Learn and design Client side validation using scripting languages | Apply |
| CO4 : Acquire knowledge about Open source JavaScript libraries | Apply, Analyze |
| CO5 : Able to design front end web page and connect to the back end databases. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | M | - | - | - | - | - | L | L | M | M | M |
| CO2 | M | M | M | M | S | M | - | - | - | - | M | L | M | M | M |
| CO3 | M | M | S | S | S | M | - | - | - | - | M | L | S | M | M |
| CO4 | S | M | M | S | S | M | - | - | - | - | M | L | S | M | S |
| CO5 | S | M | M | S | M | M | - | - | - | - | M | L | M | M | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**UNIT I - INTRODUCTION TO WWW**

Internet Standards – Introduction to WWW – WWW Architecture – SMTP – POP3 – File Transfer Protocol - Overview of HTTP, HTTP request – response — Generation of dynamic web pages.

**UNIT II - UI DESIGN**

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Markup Language (HTML): Introduction to HTML and HTML5 - Formatting and Fonts –Commenting Code – Anchors – Backgrounds – Images – Hyperlinks – Lists – Tables – Frames - HTML Forms.
Cascading Style Sheet (CSS): The need for CSS, Introduction to CSS – Basic syntax and structure - Inline Styles – Embedding Style Sheets - Linking External Style Sheets – Backgrounds – Manipulating text - Margins and Padding - Positioning using CSS.

**UNIT III - INTRODUCTION TO JAVASCRIPT**

Introduction - Core features - Data types and Variables - Operators, Expressions, and Statements - Functions - Objects - Array, Date and Math related Objects - Document Object Model - Event Handling - Controlling Windows & Frames and Documents - Form handling and validations.

**UNIT IV - ADVANCED JAVASCRIPT**

Browser Management and Media Management – Classes – Constructors – Object-Oriented Techniques in JavaScript – Object constructor and Prototyping - Sub classes and Super classes – JSON - jQuery and AJAX.

**UNIT V - PHP**

Introduction - How web works - Setting up the environment (LAMP server) - Programming basics - Print/echo - Variables and constants – Strings and Arrays – Operators, Control structures and looping structures – Functions – Reading Data in Web Pages - Embedding PHP within HTML – Establishing connectivity with MySQL database.

**TEXT BOOKS:**

1. Deitel & Deitel, Goldberg, “Internet and World Wide Web – How to Program”, Fifth edition, Pearson Education Asia, 2017.
2. Uttam K.Roy, “Web Technologies”, OXFORD University Press – 2010

**REFERENCES:**

1. Behrouz A. Forouzan ,”TCP/IP Protocol Suite”, Tata McGraw-Hill ,4th Edition,2010
2. Jeffrey C.Jackson, “Web Technologies–A Computer Science Perspective”, Pearson Education, 2008.
3. Robert. W. Sebesta, “Programming the World Wide Web”, Seventh Edition, Pearson Education, 2019.
4. Achyut S Godbole and Atul Kahate, “Web Technologies”, Second Edition, Tata McGraw Hill, 2012.
5. Harvey & Paul Deitel & Associates, Harvey Deitel and Abbey Deitel, “Internet and World Wide Web - How To Program”, Fifth Edition, Pearson Education, 2011.
6. Thomas A Powell, Fritz Schneider, “JavaScript: The Complete Reference”, Third Edition, Tata

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Email Id |
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| 1 | Mr.S.Karthik | Assistant Professor | CSE | karthik@vmkvec.edu.in |
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| 35121C01 | COGNITIVE SCIENCE | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**
This course aims understand critical thought and its interaction with knowledge and also understand problem solving and how it uses critical thought to develop solutions to problems

**PREREQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand problem solving and how it uses critical thought to develop solutions to problems |
| 2 | To explore project based learning as a specific method of problem solving |
| 3 | To examine design thinking as a sub-set of project based learning and its scaffold process for learning |
| 4 | To define argumentation and how it employs a critical though process |
| 5 | To examine specific methodologies and instruments of application for argumentation |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: The student has basic knowledge of cognitive psychology | Understand |
| CO2: The student has knowledge of how human cognition works from attention, sensation, perception, action, language processes, problem solving and thinking to learning and memory. | Apply |
| CO3: Understand Critical Thought and its interaction with knowledge 4. Understand Problem Solving and how it uses Critical Thought to develop solutions to problems | Apply |
| CO4:The student has developed a scientific attitude comprising the ability of reflection and logic reasoning | Apply, Analyze |
| CO5:The student has developed an ability of critical thinking including respect for scientific data and ethical values. | Apply,Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | M | - | M | M | - | - | L | L | M | M | M |
| CO2 | M | M | M | M | S | M | M | M | - | - | M | L | M | M | M |
| CO3 | M | M | S | S | S | M | - | - | - | - | M | L | S | M | M |
| CO4 | S | M | M | S | S | M | S | S | - | - | M | L | S | M | S |
| CO5 | S | M | M | S | M | M | S | S | - | - | M | M | M | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**Unit I-INTRODUCTION TO COGNITION**

Meaning cognitive processes, Development of cognitive psychology: Structuralism, Functionalism, Behaviourism, Memory Research, Gestalt Psychology, Emergence of cognitive psychology, Information Processing, Connectionism, Alternate approaches to cognitive psychology, Research Methods in Cognitive Psychology.

**Unit II-PERCEPTUAL PROCESSES**

Object Recognition- theories of object recognition, Bottom-Up and Top-Down Processing, Face Perception, Change Blindness. Attention: Divided attention, Selective Attentkon, Visual attention and Auditory attention. Consciousness: Varieties, Subliminal Perception. Visual Perception ¨Perceptual Organizational Processes, Multisensory interaction and Integration – Synesthesia, Comparing the senses, Perception and Action.

**Unit III-MEMORY**

Working Memory: Research on Working Memory, Factors affecting the capacity of working Memory, Baddeley's Working Memory Approach. Long Term Memory: Encoding and Retrieval in Long Term Memory, Autobiographical Memory. MemoryStrategies: Practice, Mnemonics using Imagery, Mnemonics using organization, The Multimodal Approach, Improving Prospective Memory. Metacognition :Metamemory, TOT, Metacomprehension.

**Unit IV-PROBLEM SOLVING, REASONING AND DECISION MAKING**

VUCA World Problem Solving – Types of problem, Understanding the problem, ProblemSolving Approaches, Factors that influence Problem Solving.crativity.Reasoning – Inductive and Deductive Reasoning Decision Making – Heuristics in decision making – representativeness, availability and Anchoring and adjustment.The framing effect, Overconfidence in decisions, The Hindsight Bias.

**Unit V-FUTURE SKILLS**

Critical thinking, Adaptive thinking, Cognitive Load Management, Design thinking, Virtual Collaboration and Cultural Sensitivity

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**TEXT BOOKS:**


1. Suggested Readings 1. Matlin M.W. (2003) 'Cognition' 5th Edition, Wiley Publication.
2. Riegler, B.R., Reigler, G.L. (2008), Cognitive Psychology – Applying the Science of Mind. 2nd Edition, Pearson Education.
3. Benjafield J G (2007). 'Cognition' 3rd Edition. Oxford University Press.
4. Goldstein B.E.(2008) 'Cognitive Psychology' 2nd Edition, Wadsworth.


**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Email Id |
|---|---|---|---|---|
| 1 | Mr.S.Karthik | Assistant Professor | CSE | karthik@vmkvec.edu.in |
| 2 | Dr.M.Nithya | Professor | CSE | nithya@vmkvec.edu.in |

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| 35121C03 | FULL STACK DEVELOPMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | CC | 3 | 0 | 0 | 3 |

**PREAMBLE:**

Full-stack development refers to the method of applying both front-end and back development protocols to develop websites. This field has been gaining popularity in recent years due to the growing number of digital businesses.

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To be completely able to understand how things work in web development, you should develop an understanding of HTML |
| 2 | It will help you style, plan a layout and control the behaviour and look and feel of the web apps that you build. In this module, you will learn |
| 3 | To make sense of what you're doing and to design and build new web apps, this language is used predominantly, and it is indispensable |
| 4 | React is great for Rapid app development, SPAs and for creating awesome responsive and interactive web apps |
| 5 | It is JS based, and it completes the javascript full stack experience. It is a backend skill, which is in demand and pays well. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1:The student has basic knowledge of Web Development both front and back end | Understand |
| CO2:The student has knowledge of how human cognition works from attention, sensation, perception, action, language processes, problem solving and thinking with HTML and NODEJS | Apply,Understand |
| CO3:Understand Critical Thought and React web applications | Apply ,Analyze |
| CO4: To make sense of what you're doing and to design and build new web apps, this language is used predominantly, and it is indispensable | Apply, Analyze |
| CO5: It is JS based, and it completes the javascript full stack experience. It is a backend skill, which is in demand and pays well. | Apply,Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | M | - | M | M | - | - | L | L | M | M | M |

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| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO2 | M | M | M | M | S | M | M | M | - | - | M | L | M | M | M |
| CO3 | M | M | S | S | S | M | - | - | - | - | M | L | S | M | M |
| CO4 | S | M | M | S | S | M | S | S | - | - | M | L | S | M | S |
| CO5 | S | M | M | S | M | M | S | S | - | - | M | L | M | M | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**Unit I-INTRODUCTION TO HTML**

Introduction to HTML- Browsers and HTML-Editor's Offline and Online-Tags, Attribute and Elements-Doctype Element Comments-Headings, Paragraphs, and Formatting Text-Lists and Links-Images and Tables

**Unit II- Apply With CSS**

Introduction CSS-Applying CSS to HTML-Selectors, Properties and Values-CSS Colors and Backgrounds-CSS Box Model -CSS Margins, Padding, and Borders-CSS Text and Font Properties-CSS General Topics

**Unit III-Manipulate JavaScript**

Introduction to JavaScript-Applying JavaScript (internal and external)-Understanding JS Syntax-Introduction to Document and Window Object- Variables and Operators-Data Types and Num Type Conversion-Math and String Manipulation-Objects and Arrays-Date and Time-Conditional Statements-Switch Case -Looping in JS-Functions

**Unit IV-PROBLEM SOLVING USING REACT**

Introduction- Templating using JSX-Components, State and Props-Lifecycle of Components-Rendering List and Portals-Error Handling-Routers-Redux and Redux Saga-Immutable.js-Service Side Rendering-Unit Testing-Webpack

**Unit V- Application of NodeJS**

Node js Overview-Node js - Basics and Setup-Node js Console-Node js Command Utilities-Node js Modules-Node js Concepts-Node js Events-Node js with Express js-Node js Database Access

**TEXT BOOKS:**

1. The Full Stack Developer: Your Essential Guide to the Everyday Skills Expected of a Modern Full Stack Web Developer (First Edition) - 2013

2. Full Stack Web Development For Beginners: Learn Ecommerce Web Development Using HTML5, CSS3, Bootstrap, JavaScript, MySQL, and PHP - 2018

3. Road To React: Your Journey To Master React.js in JavaScript By Robin Wieruch-2019

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4. Secrets of the JavaScript Ninja by John Resig - 2020

5. Modern Full-Stack Development: Using TypeScript, React, Node.js, Webpack, and Docker (First Edition) - 2021

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Email Id |
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| 35021P03 | BIG DATA AND ANALYTICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Big data provides unprecedented opportunities to drive information-based innovation in economies, healthcare, public safety, education, transportation and almost every human endeavour. Big data also creates risk to both individuals and society unless effective governance is in place.

**PREREQUISITE :** Nil

**COURSEOBJECTIVES**

| | |
|---|---|
| 1 | To understand how big data analytics can leverage into a key component |
| 2 | To understand the big data tools with their applications |
| 3 | To understand the big data reports for the existing tools |

**COURSEOUTCOMES**

On the successful completion of the course,students will be able to

| | |
|---|---|
| **CO1:**To understand the basics of digital data and introduction to big data | Understand |
| **CO2:** To learn the basic big data challenges,important and technologies. | Apply |
| **CO3:** To learn the Hadoop architecture and technologies. | Apply |
| **CO4:** To learn the big data applications like MongoDB,Cassandra and Hive. | Apply |
| **CO5:** To learn the Pig and Jasper Reports.. | Apply |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | | | | | | | | | L | L | | | |
| CO2 | M | | M | S | | M | | | | | | L | | | |
| CO3 | M | M | L | | L | L | | | | | M | | | | |
| CO4 | M | S | S | | | L | | | | L | | M | | | |
| CO5 | M | L | | | | | | | | | | L | | | |

S-Strong;M-Medium;L-Low

**SYLLABUS**

**DIGITAL DATA AND INTRODUCTION TO BIG DATA**

Types of Digital Data -Structured Data- Semi-Structured Data-Unstructured Data-Introduction to Big Data-What is Big Data–Characteristics of Big data- Why Big Data–Applications of Big data-Traditional Business Intelligence(BI)versus Big Data-Typical Hadoop Environment- Coexistence of Big Data and Data Warehouse.

**BIG DATA ANALYTICS**

Big Data Analytics- Classification of Analytics with examples-Greatest Challenges that Prevent Businessesfrom Capitalizing on Big Data-Greatest Challenges that Prevent Businesses from Capitalizing on Big Data-

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Technologies for Meet the Challenges Posed by Big Data-Data Science-Data Scientist- Analytics Tools.

**HADOOP**

Introduction to Hadoop-Hadoop Components-Hadoop Conceptual Layer-High Level Architecture of Hadoop-Business Value of Hadoop–GFS- Hadoop Distributed File System-Processing Data with Hadoop-Map Reduce Daemons-Map Reduce working-Map Reduce Example-Managing Resources and Application with Hadoop YARN-Hadoop Ecosystem.

**MONGODB, CASSANDRA AND HIVE**

Mongo DB- RDBMS and MongoDB-Data Types in Mongo DB-CRUD-Introduction to Apache Cassandra-Features of Cassandra- CQL DataTypes-CQLSH-Keyspaces-CRUD-Collections-UsingaCounter- Time To Live(TTL)-Alter- Import and Export-Export to CSV- Import from CSV- Import from STDIN- Export to STDOUT- System Tables-Practice Examples-Introduction to Hive-Hive Architecture-Hive Data Types-Hive File Format-Hive Query Language-RC FILE Implementation -SERDE- UDF.

**PIG AND JASPER REPORTS**

Anatomy of Pig- Pig on Hadoop-Pig Philosophy-Use Case for Pig:ETL Processing-Pig Latin Overview-DataTypes in Pig-Running Pig-Execution Modes of Pig- HDFS Commands-Relational Operators- Eval Function-Complex Data Type-Piggy Bank- UDF (User Defined Function)-Parameter Substitution-Diagnostic Operator-Word Count Example- When to use Pig?-WhenNOTtousePig?-Pigat Yahoo-Pig versus Hive- Hive Vs Pig- Introduction to Jasper Reports,Jasper soft Studio-Connecting to Mongo DB No SQL database- Connecting toCassandra No SQL Databases

**TEXT BOOKS**


1. Big Dataand Analytics-Seema Acharya and Subhashini C-WileyIndia
2. Big data for dummies-JudithHurwitz,AlanNugent,FernHalper,MarciaKaufman
3. Hadoop:TheDefinitiveGuidebyTomWhite
4. Hadoopinaction- ChuckLam
5. Hadoopfordummies-DirkDeroos,PaulC.Zikopoulos,RomanB.Melnyk,BruceBrown


**REFERENCES**


1. FrankJOhlhorst,"BigDataAnalytics:TurningBigDataintoBigMoney",WileyandSASBusinessSeries,2012.
2. ColleenMccue,"Data MiningandPredictiveAnalysis:IntelligenceGatheringandCrimeAnalysis",Elsevier,2007
3. MichaelBerthold, DavidJ.Hand, IntelligentDataAnalysis,Springer,2007.
4. AnandRajaramanandJeffreyDavidUllman, MiningofMassiveDatasets,CambridgeUniversityPress,2012.
5. BillFranks,"TamingtheBigDataTidalWave:FindingOpportunitiesinHugeDataStreamswithAdvancedAnalytics",WileyandSAS BusinessSeries,2012


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| 35021P17 | ETHICAL HACKING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**
To analyze the basic concepts of security and hacking process

**PREREQUISITE** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand Technical foundation of cracking and ethical hacking |
| 2 | To identify Aspects of security, importance of data gathering, foot printing and system hacking |
| 3 | To understand evaluation of computer security |
| 4 | To understand Practical tasks will be used to re-enforce and apply theory to encourage an analytical and problem based approach to ethical hacking |
| 5 | To discuss about security tools and its applications |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Identify and analyse the stages an ethical hacker requires to take in order to compromise a target system. | Understand |
| **CO2:** Identify tools and techniques to carry out a penetration testing. | Understand |
| **CO3:** Critically analyze security techniques used to protect system and user data. | Apply |
| **CO4:** Demonstrate systematic understanding of the concepts of security at the level of policy and strategy in a computer system. | Apply |
| **CO5:** To apply information security features in real time | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | - | - | - | - | S | - | - | - | M | M | M | S | M |
| CO2 | M | M | S | M | - | - | - | - | - | - | L | M | S | - | - |
| CO3 | M | M | M | M | - | M | - | L | - | - | L | - | S | M | S |
| CO4 | M | S | M | - | - | M | - | - | - | M | - | M | - | M | - |
| CO5 | M | M | - | - | S | M | - | L | - | - | M | M | - | - | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Introduction to Hacking, Types of Hacking, Hacking Process, Security – Basics of Security- Elements of Security, Penetration Testing, Scanning, Exploitation- Web Based Exploitation. Simple encryption and decryption techniques implementation.

**HACKING TECHNIQUES**

Building the foundation for Ethical Hacking, Hacking Methodology, Social Engineering, Physical Security, Hacking Windows, Password Hacking, and Privacy Attacks, Hacking the Network, Hacking Operating Systems- Windows & Linux, Application Hacking, Foot printing, Scanning, and Enumeration. Implementing System Level Hacking- Hacking Windows & Linux.

**WEB SECURITY**

Evolution of Web applications, Web application security, Web Application Technologies- Web Hacking, Web functionality, How to block content on the Internet, Web pages through Email, Web Messengers, Unblocking applications, Injecting Code- Injecting into SQL, Attacking Application Logic. Check authentication mechanisms in simple web applications. Implementation of Web Data Extractor and Web site watcher. Implementation of SQL Injection attacks in ASP.NET.

**WIRELESS NETWORK HACKING**

Introduction to Wireless LAN Overview, Wireless Network Sniffing, Wireless Spoofing, Port Scanning using Netcat, Wireless Network Probing, Session Hijacking, Monitor Denial of Service (DoS) UDP flood attack, Man-in-the-Middle Attacks, War Driving, Wireless Security Best Practices, Software Tools, Cracking WEP, Cracking WPA & WPA-II. Implementation- Locate Unsecured Wireless using Net-Stumbler/ Mini-Stumbler.

**APPLICATIONS**

Safer tools and services, Firewalls, Filtering services, Firewall engineering, Secure communications over insecure networks, Case Study: Mobile Hacking- Bluetooth-3G network weaknesses, Case study: DNS Poisoning, Hacking Laws. Working with Trojans using NetBus.

**TEXT BOOKS**

1. Stuart McClure, Joel Scambray, George Kurtz, "Hacking Exposed 6: Network Security Secrets & Solutions", Seventh edition, McGraw-Hill Publisher, 2012.
2. Kevin Beaver, "Hacking for Dummies" Second Edition, Wiley Publishing, 2007.
3. Dafydd Stuttard and Marcus Pinto, "The Web Application Hacker's Handbook: Discovering and Exploiting Security Flaws" Wiley Publications, 2007.
4. Ankit Fadia, "An Unofficial Guide to Ethical Hacking" Second Edition, Macmillan publishers India Ltd, 2006.

**REFERENCES**

1. Hossein Bidgoli, "The Handbook of Information Security" John Wiley & Sons, Inc., 2005.

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| 35021P24 | MOBILE COMPUTING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

To learn the standards and issues in Mobile Computing.

**PREREQUISITE**

: Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To Learn wireless communication and cellular networks basics |
| 2 | To learn various protocols that support mobility at network layer and transport layer. |
| 3 | To learn protocols in Mobile Network and Transport Layer |
| 4. | To study various mobile app development platforms and learn developing mobile applications. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Explain the basics of wireless transmission and signal processing | Understand |
| **CO2:** Understand the concept of Mobile cellular network | Understand |
| **CO3:** Understand the concept of wireless LAN network | Understand |
| **CO4:** Analyzing problems in designing mobile applications | Apply |
| **CO5:** Various mobile app development platforms and developing mobile applications. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | L | - | M | - | - | - | - | - | - | S | M | M | M |
| **CO2** | S | M | L | - | M | - | - | - | - | - | - | S | M | M | - |
| **CO3** | S | M | L | - | M | - | - | - | - | - | - | M | - | S | - |
| **CO4** | S | M | L | - | M | - | - | - | - | - | - | M | S | S | S |
| **CO5** | S | M | L | - | M | - | - | - | - | - | - | M | M | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Introduction – wireless transmission – radio propagation – signals and propagation – antennas – multiplexing and modulation – spectrum - Multiple Access Techniques: FDMA, TDMA, CDMA, OFDMA – Duplexing Techniques: FDD, TDD – Cellular Networks – Tessellation, Frequency Reuse and Handoff – Generations of Cellular Networks – 2G Systems.

**MOBILITY SUPPORT IN IP AND TCP**

Mobile IP – Mobile Agent, Foreign Agent, Care of Address, Registration, Advertisement and Discovery, Tunneling, IP within IP – Mobility Support in IPV6 – Mobility Header, Mobility Options, Dynamic Home Agent Address Discovery, Cache Management, Bidirectional Tunneling – TCP Over Wireless Networks – Indirect TCP –Snoop TCP – Mobile TCP.

**WIRELESS LAN**

Wireless LAN – IEEE 802.11 standards – HIPERLAN – Blue tooth technology and protocols. Wireless Local Loop technologies.

**APPLICATION DESIGN**

Aspects of Mobility – Middleware and Gateways – Mobile Devices and Profiles – Generic UI Development – Multimodal and Multichannel UI – Mobile Memory Management – Design Patterns for Limited Memory – Work Flow for Application Development – Techniques for Composing Applications – Dynamic Linking – Plug-ins and Rule of Thumb for Using DLLs – Concurrency and Resource Management – Look and Feel, Intents and Services – Storing and Retrieving Data – Communication via the Web – Notification and Alarms.

**APPLICATION DEVELOPMENT**

Google Android Platform – Eclipse Simulator – Android Application Architecture – Event Based Programming – Apple Iphone Platform – UI Tool Kit Interfaces – Cross Platform Design and Tools – Event Handling and Graphics Services – Layer Animation – Location Based Services – Resilient Programming Practices – Packaging and Deployment – Security And Hacking.

**TEXT BOOKS**


1. Jochen Schiller, "Mobile Communications", Addison Wesley, 2000.
2. C.Siva Ram Murthy and B.S Manoj "Ad hoc Wireless Networks", Pearson Education,2007.
3. Clint Smith, Daniel Collins, "Wireless Networks", Third Edition, McGraw Hill Publications, 2014.
4. Share Conder, Lauren Darcey, "Android Wireless Application Development", Volume I, Third Edition, Pearson, 2014.


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**REFERENCES**


1. Mobile Computing Principles-Reza B'Far-Cambridge University Press-2005.
2. Uyless Black, "Mobile and Wireless Networks", Prentice Hall , 1996.
3. Willian C.Y.Lee, Mobile Communication Design Fundamentals, John Wiley, 1993.
4. Zigurd Mednieks, Laird Dornin, G, Blake Meike and Masumi Nakamura, "Programming Android", O'Reilly, 2011
5. Alasdair Allan, "iPhone Programming", O'Reilly, 2010.
6. Donny Wals, "Mastering iOS 12 Programming", Packt, 2018.


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| 35021P01 | UNIX INTERNALS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This talk is a brief guide to UNIX programming languages, tools and concepts. It is aimed at programming novices or programmers migrating from a Windows system. The aim is to introduce you to the concepts, the possibilities and the tools used in Unix programming.

**PREREQUISITE**

NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand the design of the UNIX operating system |
| 2 | To become familiar with the various data structures used |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** To learn The basic Unix operating systems and its basic commands. | Understand |
| **CO2:** To analyze the buffers and kernel representation. | Analyze |
| **CO3:** To analyze the UNIX system structure, system calls. | Analyze |
| **CO4:** To understand UNIX segmentation, scheduling, paging. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | L | L | M | - | - | - | - | - | - | M | S | M | M |
| **CO2** | S | M | L | L | M | - | - | - | - | - | - | M | S | M | M |
| **CO3** | S | M | L | - | L | - | - | - | - | - | - | M | S | M | M |
| **CO4** | S | M | L | L | M | - | - | - | - | - | - | M | S | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

General Review of the System-History-System structure-User Perspective-Operating System Services-Assumptions About Hardware. Introduction to the Kernel-Architecture System Concepts-Data Structures-System Administration

**DISK BLOCKS**

The Buffer Cache-Headers-Buffer Pool-Buffer Retrieval-Reading and Writing Disk Blocks - Advantages and Disadvantages. Internal Representation of Files-Inodes- Structure-Directories-Path Name to Inode- Super Block-Inode Assignment-Allocation of Disk Blocks -Other File Types

**FILE SYSTEM**

System Calls for the File System-Open-Read-Write-Lseek-Close-Create-Special files Creation -Change Directory and Change Root-Change Owner and Change Mode-Stat- Fstat-Pipes-Dup-Mount-Unmount-Link-Unlink-File System Abstraction-Maintenance.

**PROCESS MANAGEMENT**

The System Representation of Processes-States-Transitions-System Memory-Context of a Process-Saving the Context-Manipulation of a Process Address Space-Sleep Process Control-signals-Process Termination-Awaiting-Invoking other Programs-The Shell-System Boot and the INIT Process.

**MEMORY MANAGEMENT**

Memory Management Policies-Swapping-Demand Paging-a Hybrid System-I/O Subsystem-Driver Interfaces-Disk Drivers-Terminal Drivers.

**TEXT BOOKS**

1. Maurice J. Bach, "The Design of the Unix Operating System", Pearson Education 2002.

**REFERENCES**

1. UreshVahalia, "UNIX Internals: The New Frontiers", Prentice Hall, 2000.
2. John Lion, "Lion's Commentary on UNIX", 6th edition, Peer-to-Peer Communications, 2004.
3. Daniel P. Bovet & Marco Cesati, “Understanding the Linux Kernel”, O’REILLY, Shroff Publishers &Distributors Pvt. Ltd, 2000.
4. M. Beck et al, “Linux Kernel Programming

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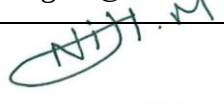

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| 35021P36 | WIRELESS AND SENSOR NETWORKS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enables them to learn about wireless and sensor networks. This syllabus helps the students to study and identify different issues in wireless and sensor networks, to analyze protocols developed for wireless and sensor networks, to Identify different issues in wireless ad hoc and sensor networks and to Identify and critique security issues in wireless and sensor networks.

**PREREQUISITE Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Understand the architecture, standards and applications of wireless sensor networks(WSN) |
| 2 | Analyze the need and structure of MAC protocol for WSN |
| 3 | Develop WSN protocols and analyze their performance |
| 4 | Identify the need and selection of operating system for WSN |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Describe the type of sensor networks, protocols and applications of WSN | Understand |
| **CO2:** Identify various hardware, software platforms for sensor networks | Knowledge |
| **CO3:** Analyze the design issues of MAC and Physical layers of WSN | Analyze |
| **CO4:** Create architecture and Identify need and selection of protocols for WSN | Understand & Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | COs | PO1 | PO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | L | L | S | S | -- | -- | -- | M | M | -- | -- | -- | CO1 | L | L |
| CO2 | S | S | S | S | -- | -- | -- | S | M | -- | -- | -- | CO2 | L | L |
| CO3 | L | M | S | S | -- | -- | -- | M | M | -- | -- | -- | CO3 | S | L |
| CO4 | | M | S | S | -- | -- | -- | M | M | -- | -- | -- | CO4 | M | L |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION OVERVIEW AND APPLICATIONS OF WIRELESS SENSOR NETWORK**

Introduction, Basic overview of the Technology, Applications of Wireless Sensor Networks: Introduction, Background, Range of Applications, Examples of Category 2 WSN Applications, Examples of Category 1 WSN Applications, Another Taxonomy of WSN Technology.

**BASIC WIRELESS SENSOR TECHNOLOGY AND SYSTEMS**:

Introduction, Sensor Node Technology, Sensor Taxonomy, WN Operating Environment, WN Trends, Wireless Transmission Technology and Systems: Introduction, Radio Technology Primer, Available Wireless Technologies

**SENSOR NETWORKS – INTRODUCTION & ARCHITECTURES**

Challenges for Wireless Sensor Networks, Enabling Technologies for Wireless Sensor Networks, WSN application examples, Single-Node Architecture – Hardware Components, Energy Consumption of Sensor Nodes, Network Architecture – Sensor Network Scenarios, Transceiver Design Considerations, Optimization Goals and Figures of Merit.

**TRANSPORT CONTROL AND MIDDLEWARE FOR WIRELESS SENSOR NETWORKS**

Traditional Transport Control Protocols, Transport Protocol Design Issues, Examples of Existing Transport Control Protocols, Performance of Transport Control Protocols.

Middleware Apply are for Wireless Sensor Networks: Introduction, WSN Middleware Principles, Middleware Architecture, Existing Middleware.

**SENSOR NETWORK SECURITY**

Network Security Requirements, Issues and Challenges in Security Provisioning, Network Security Attacks, Layer wise attacks in wireless sensor networks, possible solutions for jamming, tampering, black hole attack, flooding attack. Key Distribution and Management, Secure Routing – SPINS, reliability requirements in sensor networks..

**TEXT BOOKS**

1. Kazem Sohraby, Daniel Minoli, TaiebZnati, "Wireless Sensor Networks: Technology, Protocols and Applications:, Wiley , 2nd Edition (Indian) , 2014.

**REFERENCES**

1. Ian F. Akyildiz, Mehmet Can Vuran "Wireless Sensor Networks", Wiley, 2010.
2. Feng Zhao & Leonidas J. Guibas, "Wireless Sensor Networks- An Information Processing Approach", Elsevier, 2007.

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| 35121P03 | TCP / IP PROTOCOL SUITE | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

To understand the concepts of TCP/IP protocol suite.The purpose of this course is to understand the concepts of network programming using the network protocols such us TCP, UDP and sockets. Creates the simple network management for routing. Trace and monitoring the flow of information from one node to another node in the network.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To grasp the introduction of OSI model. |
| 2 | To understand the layering concepts in computer networks. |
| 3 | To understand the functions of each layer. |
| 4 | To learn and develop macros for including objects in MIB structure |
| 5 | To have knowledge on various network management tools |

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Implement client/server communications using TCP and UDP Sockets | Remember and Understand |
| CO2. Describe the usage of socket options for handling various Sockets in programming | Remember and Understand |
| CO3. Understand handling of raw sockets | Understand |
| CO4. Explain functionalities of SNMP and MIB structure. | Understand, Apply, analyse and evaluate |
| CO5. Experiment with various tools available to manage a network | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | S | M | - | - | - | M | - | M | M | | | |
| CO2 | S | M | L | M | S | - | - | - | - | - | M | M | | | |
| CO3 | S | S | S | - | M | - | - | - | M | - | L | | | | |
| CO4 | S | S | S | - | S | M | - | - | M | - | M | M | | | |
| CO5 | S | | M | - | M | - | - | - | M | L | M | M | | | |

S- Strong; M-Medium; L-Low

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**1. INTRODUCTION**

Protocols and standards – OSI model – TCP / IP protocol suite – addressing – versions – Underlying technologies.

**2. IP ADDRESSES, ROUTING, ARP AND RARP**

Classful addressing – other issues – sub netting – super netting – classless addressing – routingMethods – delivery – table and modules – CIDR – ARP package – RARP.

**3. IP, ICMP, IGMP AND UDP**

Datagram – fragmentation – options – checksum – IP package – ICMP – messages, formats – Error reporting – query – checksum – ICMP package – IGMP – messages, operation – Encapsulation – IGMP package – UDP – datagram – checksum – operation – uses – UDP Package.

**4. TCP, UNICAST AND MULTICAST ROUTING PROTOCOLS**

Services – flow, congestion and error control – TCP package and operation – state transition Diagram – unicast routing protocols – RIP – OSPF – BGP – multicast routing – trees – protocols – MOSPF – CBT – PIM

**5. APPLICATION LAYER, SOCKETS**

Client server model – concurrency – processes – sockets – byte ordering – socket system calls – TCP and UDP client-server programs – BOOTP -DHCP – DNS – name space, resolution – types of records – concept – mode of operation – Rlogin.

**TEXT BOOKS**

1. Behrouz Forouzan, "TCP/IP protocol suite ", 2nd edition, Tata McGrawhill.

**REFERENCE**

1. Douglas Comer, "Internetworking with TCP / IP" ,Vol – 1, PHI, 2000.

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| 35021P05 | C# AND .NET APPLICATION DEVELOPMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

To provide an introduction to the .NET framework and enable the student to program in C#.

**PREREQUISITE: Object Oriented Programming**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To study basic and advanced features of the C# language |
| **2.** | To create form based and web based applications |
| **3.** | To study the internals of the .NET framework |
| **4.** | To learn about ADO.Net |
| **5.** | To learn about different web services |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** To learn the basics of .net Frame work and C# language | Understand |
| **CO2.** To learn C# elements and OOPS concepts | Apply |
| **CO3.** To learn interface and inheritance concepts in C# language | Analyze |
| **CO4.** To learn fundamentals of window application programming and create a window application | Apply |
| **CO5.** To develop web applications and learn advanced | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1.** | S | M | M | M | M | - | - | - | - | - | - | - | M | - | - |
| **CO2.** | S | M | M | L | L | - | - | - | - | - | - | - | M | M | M |
| **CO3.** | S | M | S | | M | - | - | - | - | - | - | - | M | M | M |
| **CO4.** | S | M | L | | M | - | - | - | - | - | - | - | M | M | - |
| **CO5.** | S | M | L | L | M | - | - | - | - | - | - | - | S | M | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION:**

Overview Of .Net-Advantages Of .Net Over Other Languages-Assemblies-.Net Architecture-The Role of C# In The .Net Enterprise Architecture-The Common Language Runtime-C# Basics-Objects And Types-Inheritance –Arrays

**OBJECT ORIENTED ASPECTS OF C#:**

Operators and Casts: Operators - Type Safety - Operator Overloading - User-Defined Casts. Delegates and Events: Delegates – Events. Strings and Regular Expressions: System.String -Regular Expressions. Collections: Collection Interfaces and Types – Lists - Queues – Stacks -Linked Lists - Sorted Lists – Dictionaries – Hash Set - Bit Arrays – Performance-Indexers

**I/O AND NETWORK PROGRAMMING:**

Tracing and events - threading and synchronization - .Net security – localization –Manipulating XML - Managing the file system – basic network programming.

**ADO.NET: #:**

Data Access: ADO.NET Overview - Using Database Connections – Commands - Fast Data Access: The Data Reader - Managing Data and Relationships: The DataSet Class – XML Schemas: Generating Code with XSD – Working with ADO.NET. Windows Forms: Creating a Windows Form Application - Control Class - Standard Controls and Components – Forms. Data Binding: The Data Grid View Control - Data Grid View Class Hierarchy - Data Binding - Visual Studio .NET and Data Access.

**ASP.NET AND WEB SERVICES:**

ASP.NET Pages: ASP.NET Introduction - ASP.NET Web Forms - ADO.NET and Data Binding.ASP.NET Development: User and Custom Controls - Master Pages - Site Navigation – Security –Themes- Web Parts. ASP.NET AJAX: What Is Ajax - What Is ASP.NET AJAX - Using ASP.NET AJAX.

**TEXT BOOK**


1. Christian Nagel, Bill Evjen, Jay Glynn, Morgan Skinner, Karli Watson, Professional C# 2008, Wiley Publishing, Inc., 2008. ISBN: 978-8-126-51627-8.


**REFERENCE BOOKS**


1. Andrew Troelsen, "C# and the .NET Platform", A! Press, 2005.
2. Herbert Schildt, "The Complete Reference: C#", Tata McGraw-Hill, 2004.
3. Kevin Hoffman, "Visual C# 2005", Pearson Education, 2006.


**COURSE DESIGNERS**


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| 35021P06 | CLOUD COMPUTING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

To study and understand the concepts in cloud computing and apply them practically.

**PREREQUISITE** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To understand cloud computing concepts. |
| **2.** | To study various cloud services. |
| **3.** | To apply cloud computing in collaboration with other services. |
| **4.** | To Apply cloud computing services. |
| **5.** | To apply cloud computing online. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Able to Understand basics in Cloud Computing | Understand |
| **CO2:** Able to apply cloud computing concepts in real time | Apply |
| **CO3:** Able to develop cloud computing projects | Apply |
| **CO4**: Able to apply cloud services | Apply |
| ***CO5:*** *Able to collaborate cloud services with other applications* | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO2** | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO3** | M | M | S | M | - | - | - | - | - | - | - | - | M | M | M |
| **CO4** | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| **CO5** | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

| **INTRODUCTION** |
|---|
| Cloud Computing – History of Cloud Computing – Cloud Architecture – Cloud Storage –Why Cloud Computing Matters – Advantages of Cloud Computing – Disadvantages of Cloud Computing – Companies in the Cloud Today – Cloud Services. |
| **DEVELOPING CLOUD SERVICES** |
| Web-Based Application – Pros and Cons of Cloud Service Development – Types of Cloud Service Development – Software as a Service – Platform as a Service – Web Services – On-Demand Computing – Discovering Cloud Services Development Services and Tools – Amazon Ec2 – Google App Engine – IBM Clouds. |
| **CLOUD COMPUTING FOR EVERYONE** |
| Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation. |
| **USING CLOUD SERVICES** |
| Collaborating on Calendars, Schedules and Task Management – Exploring Online Scheduling Applications – Exploring Online Planning and Task Management – Collaborating on Event Management – Collaborating on Contact Management – Collaborating on Project Management – Collaborating on Word Processing - Collaborating on Databases – Storing and Sharing Files. |
| **COLLABORATING ONLINE** |
| Collaborating via Web-Based Communication Tools – Evaluating Web Mail Services –Evaluating Web Conference Tools – Collaborating via Social Networks and Groupware –Collaborating via Blogs and Wikis. |
| **TEXT BOOKS** |
| 1. Rajkumar Buyya, James Broberg, Andzej M.Goscinski, "Cloud Computing –Principles and Paradigms",John Wiley & Sons, 2010.<br>2. Michael Miller, "Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online", Que Publishing, August 2008. |
| **REFERENCES** |
| 1. Haley Beard, "Cloud Computing Best Practices for Managing and Measuring. Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs", Emereo Pty Limited, July 2008. |

**COURSE DESIGNERS**

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| 35021P02 | AGILE METHODOLOGIES | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Software Development is an umbrella term for an arrangement of strategies and practices in light of the qualities and standards communicated in the Agile Manifesto. Arrangements advance through coordinated effort between self-sorting out, cross-utilitarian groups using the suitable practices for their specific circumstance.

**PREREQUISITE :Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand the background and driving forces for taking an Agile approach to software development |
| 2 | To obtain practical knowledge of agile development frameworks and be able to distinguish between agile and traditional project management methodologies. |
| 3 | To Examine various metrics for adopting agile software engineering |
| 4 | Describe how an unit tests is executed from beginning to end. |
| 5 | Identify the approaches, tools and scenarios to introduce Agile to your organization effectively |
| 6 | To design automated build tools, version control and continuous integration |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Identify the fundamentals of agile and scrum framework | Understand |
| **CO2:** Apply design principles and refactoring to achieve Agility. | Apply |
| **CO3:** Reduce the risks in Test driven approach in agile projects | Analyze |
| **CO4:** Implement a real software project that implements agile execution techniques | Apply |
| **CO5:** Deploy a firm basis for adopting agile methodology, regardless of the industry/professional sector. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | M | M |
| **CO2** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | M | M |
| **CO3** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | M | M |
| **CO4** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | M | M |
| **CO5** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**FUNDAMENTALS OF AGILE**

The Genesis of Agile- Introduction and background- Agile Manifesto and Principles- Overview of Scrum- Extreme Programming- Feature Driven development- Lean Software Development- Agile project management- Design and development practices in Agile projects- Test Driven Development- Continuous Integration- Refactoring- Pair Programming- Simple Design- User Stories- Agile Testing- Agile Tools.

**AGILE SCRUM FRAMEWORK**

Introduction to Scrum- Project phases- Agile Estimation- Planning game- Product backlog- Sprint backlog- Iteration planning- User story definition- Characteristics and content of user stories- Acceptance tests and Verifying stories- Project velocity- Burn down chart- Sprint planning and retrospective- Daily scrum- Scrum roles – Product Owner- Scrum Master- Scrum Team- Scrum case study- Tools for Agile project management.

**AGILE TESTING**

The Agile lifecycle and its impact on testing- Test-Driven Development (TDD)- xUnit framework and tools for TDD- Testing user stories - acceptance tests and scenarios- Planning and managing testing cycle- Exploratory testing- Risk based testing- Regression tests- Test Automation- Tools to support the Agile tester.

**AGILE SOFTWARE DESIGN AND DEVELOPMENT**

Agile design practices- Role of design Principles including Single Responsibility Principle- Open Closed Principle- Liskov Substitution Principle- Interface Segregation Principles- Dependency Inversion Principle in Agile Design- Need and significance of Refactoring- Refactoring Techniques- Continuous Integration- Automated build tools- Version control.

**INDUSTRY TRENDS**

Market scenario and adoption of Agile- Agile ALM- Roles in an Agile project- Agile applicability- Agile in Distributed teams- Business benefits- Challenges in Agile- Risks and Mitigation- Agile projects on Cloud- Balancing Agility with Discipline- Agile rapid development technologies

**TEXT BOOKS**


1. Ken Schawber, Mike Beedle, "Agile Software Development with Scrum", Pearson, 21 Mar 2008.
2. Robert C. Martin, "Agile Software Development, Principles, Patterns and Practices", Prentice Hall, 25 Oct 2002.
3. Lisa Crispin, Janet Gregory, "Agile Testing: A Practical Guide for Testers and Agile Teams", Addison Wesley, 30 Dec 2008
4. www.it-ebooks.info/tag/agile
5. http://martinfowler.com/agile.html


**REFERENCES**


1. Alistair Cockburn, "Agile Software Development: The Cooperative Game", Addison Wesley, 19 Oct 2006.
2. Mike Cohn Publisher, "User Stories Applied: For Agile Software", Addison Wesley, 1 Mar 2004


**COURSE DESIGNERS**


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| 35021P23 | MACHINE LEARNING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

To provide an in-depth knowledge about machine learning concepts and identify applications suitable for different types of machine learning with suitable justification.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To study the outline the key concepts of machine learning |
| 2 | To understand the supervised learning and classification techniques |
| 3 | To apply the concept of unsupervised learning and Clustering for applications |
| 4 | To learn theoretical and practical aspects of dimensionality reduction |
| 5 | To learn theoretical and practical aspects of reinforcement learning |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:**Understand the key concepts of machine learning | Understand |
| **CO2:**Understand and apply supervised learning and classification techniques | Understand |
| **CO3:** Apply the concept of unsupervised learning and Clustering for applications | Apply |
| **CO4:**Understand theoretical and practical aspects o dimensionallity reduction | Understand |
| **CO5:** Understand theoretical and practical aspects of reinforcement learning | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PSO1 | PSO2 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | - | - | - | - | L | - | - | - | - | - | L | - |
| **CO2** | S | S | S | L | - | L | - | L | L | - | L | S | M |
| **CO3** | S | S | M | L | - | L | - | L | L | - | L | S | M |
| **CO4** | S | L | M | L | - | L | - | - | - | - | - | - | - |
| **CO5** | S | L | S | - | - | L | - | L | - | - | - | - | L |

S- Strong; M-Medium; L-Low

Dr. M. NITHYA,
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**SYLLABUS**

**INTRODUCTION**

Machine Learning - Examples of machine learning applications- Types of machine learning –Model selection and generalization – Guidelines for Machine Learning Experiments

**SUPERVISED LEARNING**

Classification - Decision Trees – Univariate Tree –Multivariate Tree - Pruning –Perceptron – Multilayer Perceptron - Back Propagation – Cross Validation and Resampling Methods

**UNSUPERVISED LEARNING**

Clustering- Mixture densities -K-means - EM Algorithm – Supervised Learning After Clustering- Hierarchical Clustering

**DIMENSIONALITY REDUCTION**

The Curse of Dimensionality –Subset Collection - Principal Component Analysis - Factor Analysis – Linear Discriminant Analysis, Accuracy, Precision, recall, F measure.

**REINFORCEMENT LEARNING**

Single State Case – Elements of Reinforcement Learning - Model Based Learning – Temporal Difference Learning – Generalization in Reinforcement Learning - Policy Search

**TEXT BOOKS**

1. EthemAlpaydin, Introduction to Machine Learning MIT Press, 2014.

**REFERENCES**

1. Tom M Mitchell, Machine Learning, First Edition, McGraw Hill Education, 2013
2. Richard S. Sutton and Andrew G. Barto: Reinforcement Learning: An Introduction. MIT Press

**COURSE DESIGNER**



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| 35021P13 | DEEP LEARNING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course provides an introduction to the basics of machine learning, neural networks, and Deep learning techniques. This course also provides the learning practice and acquires knowledge on deep learning tools.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To study the basics of machine learning, neural networks and deep learning |
| 2 | To study the present the mathematical, statistical and computational challenges of building deep neural networks |
| 3 | To study the dimensionality reduction techniques |
| 4 | To know deep learning techniques to support real-time applications |
| 5 | To examine the case studies of deep learning techniques |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:**Understand basics of machine learning, neural networks and deep learning | Understand |
| **CO2:**Implement various deep learning models | Apply |
| **CO3:**Realign high dimensional data using reduction techniques | Apply |
| **CO4:U**nderstand and apply scaling up machine learning techniques and associated computing techniques and technologies | Apply |
| **CO5:** Analyze optimization and generalization in deep learning | Apply |
| **CO6:** Explore the deep learning application | Create |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | - | S | M | - | M | - | - | M | M | - | M | M | M | - | - |
| **CO2** | S | S | S | S | M | - | - | M | M | - | M | M | - | - | M |
| **CO3** | S | M | M | S | M | - | - | M | M | - | M | M | M | - | - |
| **CO4** | S | M | M | S | M | - | - | M | M | - | M | M | M | - | - |
| **CO5** | S | M | M | S | M | - | - | M | M | - | M | M | M | - | - |
| **CO6** | S | M | M | S | M | - | - | M | M | - | M | M | - | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Introduction to machine learning- Linear models (SVMs and Perceptions, logistic regression)- Intro to Neural Nets: What a shallow network computes- Training a network: loss functions, back propagation and stochastic gradient descent- Neural networks as universal function approximate.

**DEEP NETWORKS**

History of Deep Learning- A Probabilistic Theory of Deep Learning- Back propagation and regularization, batch normalization- VC Dimension and Neural Nets-Deep Vs Shallow Networks Convolutional Networks- Generative Adversarial Networks (GAN), Semi-supervised Learning.

**DIMENSIONALITY REDUCTION**

Linear (PCA, LDA) and manifolds, metric learning - Auto encoders and dimensionality reduction in networks - Introduction to Convnet - Architectures – AlexNet, VGG, Inception, ResNet - Training a Convnet: weights initialization, batch normalization, hyper parameter optimization.

**OPTIMIZATION AND GENERALIZATION**

Optimization in deep learning– Non-convex optimization for deep networks- Stochastic Optimization- Generalization in neural networks- Spatial Transformer Networks- Recurrent networks, LSTM - Recurrent Neural Network Language Models- Word-Level RNNs & Deep Reinforcement Learning - Computational & Artificial Neuroscience.

**CASE STUDY AND APPLICATIONS**

Imagenet- Detection-Audio WaveNet-Natural Language Processing Word2Vec - Joint DetectionBioInformatics- Face Recognition- Scene Understanding- Gathering Image Captions.

**REFERENCE BOOKS**


1. CosmaRohillaShalizi, Advanced Data Analysis from an Elementary Point of View, 2015.
2. Deng & Yu, Deep Learning: Methods and Applications, Now Publishers, 2013.
3. Ian Goodfellow, YoshuaBengio, Aaron Courville, Deep Learning, MIT Press, 2016.
4. Michael Nielsen, Neural Networks and Deep Learning, Determination Press, 2015.


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| 35021P12 | DATA VIRTUALIZATION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course focuses on the challenges in setting up a data center. Resource monitoring using hypervisors and access control to virtual machines will be covered in depth in this course. Setting up of a virtual data center and how to manage them with software interfaces will be discussed in detail

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn the concepts of Web design patterns and page design |
| 2 | To understand and learn the scripting languages with design of web applications |
| 3 | To learn the maintenance and evaluation of web design |
| 4 | To learn about Resource monitoring and virtual machine data Protection |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Explain the concept of data center and Evolution of Data Centre | Understand |
| **CO2:** Apply enterprise-level virtualization machines through software management interfaces, Environments connectivity. | Apply |
| **CO3:** Illustrate the virtualization deployment, modification, management; monitoring and migration methodologies | Apply |
| **CO4:** Analyze the utility in Windows Vista and later, displays information about the use of hardware and software resources in real time. | Analyze |
| **CO5:** Develop the resource monitoring and virtual machine data Protection skills. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | M | - |
| **CO2** | S | L | L | - | M | - | - | - | - | - | - | M | **S** | M | M |
| **CO3** | S | M | L | - | M | - | - | - | - | - | - | M | **S** | - | M |
| **CO4** | S | M | L | - | L | - | - | - | - | - | - | M | **S** | M | M |
| **CO5** | S | L | L | - | M | - | - | - | - | - | - | M | **S** | M | - |

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**SYLLABUS**

**DATA CENTER CHALLENGES**

How server, desktop, network Virtualization and cloud computing reduce data centre footprint, environmental impact and power requirements by driving server consolidation; Evolution of Data Centres: The evolution of computing infrastructures and architectures from standalone servers to rack optimized blade servers and unified computing systems (UCS).

**ENTERPRISE-LEVEL VIRTUALIZATION**

Provision, monitoring and management of a virtual datacenter and multiple enterprise-level virtual servers and virtual machines through software management interfaces; Networking and Storage in Enterprise Virtualized Environments - Connectivity to storage area and IP networks from within virtualized environments using industry standard protocols

**VIRTUAL MACHINES & ACCESS CONTROL**

Virtual machine deployment, modification, management; monitoring and migration methodologies.

**RESOURCE MONITORING**

Physical and virtual machine memory, CPU management and abstraction techniques using a hypervisor

**VIRTUAL MACHINE DATA PROTECTION**

Backup and recovery of virtual machines using data recovery techniques; Scalability - Scalability features within Enterprise virtualized environments using advanced management applications that enable clustering, distributed network switches for clustering, network and storage expansion; High Availability : Virtualization high availability and redundancy techniques.

**TEXT BOOKS**

1. Mickey Iqbal, "IT Virtualization Best Practices: A Lean, Green Virtualized Data Center Approach", MC Press [ISBN: 978-1583473542] 2012.

2. Mike Laverick, "VMware vSphere 4 Implementation" Tata McGraw-Hill Osborne Media; 1 edition [ISBN: 978-0071664523], 2012.

3. Jason W. McCarty, Scott Lowe, Matthew K. Johnson, "VMware vSphere 4 Administration Instant

**REFERENCES**

1. Brian Perry, Chris Huss, Jeantet Fields, "VCP VMware Certified Professional on vSphere 4 Study Guide" Sybex; edition [ISBN: 978-0470569610], 2013.

2. Jason Kappel, Anthony Velte, Toby Velte, "Microsoft Virtualization with Hyper-V: Manage Your Datacenter with Hyper-V, Virtual PC, Virtual Server, and Application Virtualization" McGraw-Hill Osborne [ISBN: 978- 007161

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| 35021P10 | DATA MINING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Data warehousing and data mining is one of the most advanced fields of computer science which involves use of Mathematics, Statistics, Information Technology and information Sciences in discovering new information and knowledge from large databases It is a new emerging interdisciplinary area of research and development which has created interest among scientists of various disciplines.

**PREREQUISITE :** Database Management Systems

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | Distinguish a data warehouse from an operational database system, and appreciate the needs for developing a data warehouse for large corporation. |
| **2.** | Describe the problems and processes involved in the development of a data warehouse |
| **3.** | To explain the process of data mining and its importance. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:**. To understand the basics of data warehousing and mining | Understand |
| **CO2:** To learn the data pre-processing, language, architectures, concept description. | Apply |
| **CO3:** To learn the association rules and its algorithms. | Apply |
| **CO4**: To learn the classification and clustering rules and the respective algorithms | Apply |
| ***CO5:*** *To know the latest trends about the data warehousing and mining* | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | L | | M | - | - | - | - | - | - | - | - | M | M | M |
| CO2 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO3 | S | L | | L | - | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | L | - | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION AND DATA WAREHOUSING**

Introduction, Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Implementation, Further Development, Data Warehousing to Data Mining.

**DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, CONCEPT DESCRIPTION**

Why Pre-processing, Cleaning, Integration, Transformation, Reduction, Discretization, Concept Hierarchy Generation, Data Mining Primitives, Query Language, Graphical User Interfaces, Architectures, Concept Description, Data Generalization, Characterizations, Class Comparisons, Descriptive Statistical Measures.

**ASSOCIATION RULES**

Association Rule Mining, Single-Dimensional Boolean Association Rules from Transactional Databases, Multi-Level Association Rules from Transaction Databases.

**CLASSIFICATION AND CLUSTERING**

Classification and Prediction, Issues, Decision Tree Induction, Bayesian Classification, Association Rule Based, Other Classification Methods, Prediction, Classifier Accuracy, Cluster Analysis, Types of data, Categorization of methods, Partitioning methods, Outlier Analysis.

**RECENT TRENDS**

Multidimensional Analysis and Descriptive Mining of Complex Data Objects, Spatial Databases, Multimedia Databases, Time Series and Sequence Data, Text Databases, World Wide Web, Applications and Trends in Data Mining.

**TEXT BOOK**

1. J. Han, M. Kamber, “Data Mining: Concepts and Techniques”, Harcourt India / Morgan Kauffman, 2001.

**REFERENCES**

1. Margaret H.Dunham, "Data Mining: Introductory and Advanced Topics", Pearson Education 2004.
2. Sam Anahory, Dennis Murry, "Data Warehousing in the real world", Pearson Education 2003.
3. David Hand, Heikki Manila, Padhraic Symth, "Principles of Data Mining", PHI 2004.
4. W.H.Inmon, "Building the Data Warehouse", 3rd Edition, Wiley, 2003.
5. Alex Bezon, Stephen J.Smith, "Data Warehousing, Data Mining & OLAP", MeGraw-Hill Edition, 2001.
6. Paulraj Ponniah, "Data Warehousing Fundamentals", Wiley-Interscience Publication, 2003.

**COURSE DESIGNERS**

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|---|---|---|---|---|
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Dr. M. NITHYA, Dept. of Computer Science & Engg

| 35021P08 | COMPUTER GRAPHICS AND MULTIMEDIA | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**Preamble**

Computer Graphics is referred as language of engineers. An engineer needs to understand the physical geometry of any object through its orthographic or pictorial projections. The knowledge on Computer graphics is essential in proposing new product through drawings and interpreting data from existing drawings. This course deals with orthographic and pictorial projections, sectional views and development of surfaces.

**Prerequisite** NIL

**Course Objective**

| | |
|---|---|
| | To implement the orthographic projections of points, straight lines, plane surfaces and solids. |
| | To construct the orthographic projections of sectioned solids and true shape of the sections. |
| | To develop lateral surfaces of the uncut and cut solids. |
| | To draw the pictorial projections (isometric and perspective) of simple solids. |
| | To sketch by free hand the orthographic views from the given pictorial view. |

**Course Outcomes: On the successful completion of the course, students will be able to**

| | | |
|---|---|---|
| CO1. | Execute in the form of drawing of the orthographic projections of points, straight lines, plane surfaces and solids. | Apply |
| CO2. | Demonstrate in the form of drawing of the orthographic projections of sectioned solids and true shape of the sections. | Apply |
| CO3. | Develop lateral surfaces of the solid section and cut section of solids. | Apply |
| CO4. | Draw the pictorial projections (isometric and perspective) of simple solids. | Apply |
| CO5. | Implement the free hand sketch of the orthographic views from the given pictorial view. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | L | | M | - | - | - | - | - | - | - | - | M | M | M |
| CO2 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO3 | S | L | | L | - | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | L | - | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

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**Syllabus:**

**Unit 1: INTRODUCTION TO COMPUTER GRAPHICS :** Brief Survey of Computer Graphics – Graphics Systems: Video Display Devices – Types – Raster-Scan Systems and Random-Scan Systems – Input Devices – Hard-Copy Devices – Graphics Software.

**Unit-2: OUTPUT PRIMITIVES AND THEIR ATTRIBUTES** Line-Drawing (DDA and Bresenham's) Algorithms – Circle-Generating (Midpoint) Algorithm – Ellipse-Generating (Midpoint) Algorithms- Area-Filling (Boundary-Fill and Flood-Fill) Algorithms - Line Attributes - Color and Grayscale Levels – Character Attributes – Inquiry Functions.

**Unit 3: TWO-DIMENSIONAL TRANSFORMATIONS AND VIEWING:** Basic Transformations - Matrix Representations and Homogeneous Coordinates – Composite Transformations - Other Transformations – Window-to- Viewport Coordinate Transformation – Clipping Algorithms: Cohen-Sutherland Line Clipping and Sutherland- Hodgeman Polygon Clipping – Basic Modeling Concepts - Interactive Input Methods: Logical Classification of Input Devices – Interactive Picture-Construction Techniques.

**Unit-4: THREE-DIMENSIONAL CONCEPTS:** Three-Dimensional Display Methods: Parallel and Perspective Projections – Depth Cueing - Visible Line and Surface Identification – Polygon Surfaces: Polygon Tables, Plane Equations and Polygon Meshes - Three-Dimensional Transformations: Basic, Other and Composite Transformations.

**Unit-5 : THREE-DIMENSIONAL VIEWING :** Viewing Pipeline and Coordinates – Transformation from World to Viewing Coordinates – Projection Transformations - Matrices - View Volumes - Hidden Surface and Hidden Line Elimination Methods: Back-Face Detection , Depth-Buffer and A-Buffer Methods –Wire frame Methods- Light Sources – RGB,CMY and HLS Color Models – Computer Animation: Design of its Sequences and Language

**Text Books**

1. Donald Hearn and Pauline Baker M, "Computer Graphics", Prentice Hall, New Delhi, 2007 (UNIT V).
2. Elements of Multimedia *By Sreeparsna Banerjee*Published May 8, 2019 by Chapman and Hall/CRC 203 Pages 49 B/W Illustrations

**Reference Books**

1. Introduction to Computer Graphics and Multimedia by Anirban Mukhopadhyay
2. Introduction to Computer Graphics

**COURSE DESIGNERS**

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Dr. M. NITHYA, Prof & Head, Dept. of Computer Science & Engg, V.M.K.V. Engg. College, Salem.

| 35021P26 | NETWORK DESIGN AND MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Ability to access, compile and use MIBs, to implement a Network Management System, and to formulate SLAs and Policies for Network Management.

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Appreciate methods of analysis and problem-solving techniques for network management |
| 2 | Understand SNMP message formats |
| 3 | Integrate SNMP, SMI, and Web-based management |
| 4 | Understand the importance of SLAs and Policies in Network Management |
| 5 | To understand the concept of MPLS |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Realize the methods of analysis and problem-solving techniques for network management | Apply |
| **CO2:** Describe the tools and applications used for network management | Apply |
| **CO3:** The ability to make a critical evaluation of the theories, techniques and systems used in planning, design, implementation and security of modern communication networks as well as the services they support | Analyze |
| **CO4:** Configure Protocol, methods and Policies to deploy the Network Management Architecture | Analyze |
| **CO5:** Examines broader issues associated with network management including Models<br>Provisioning Issues, Mechanisms and Management Interfaces | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | S | M | M | - | - | - | - | - | - | - | M | S | M | M |
| **CO2** | M | S | S | M | L | - | - | - | - | - | - | M | S | M | - |
| **CO3** | S | M | M | M | M | - | - | - | - | - | - | M | S | M | M |
| **CO4** | M | M | M | M | L | - | - | - | - | - | - | M | M | - | - |
| **CO5** | M | S | M | S | M | - | - | - | - | - | - | M | M | S | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**OVERVIEW**

Requirements for the Management of Networked Systems, Management Scenarios, Management Functions, Organizational Aspects of Management, Time Aspects of Management, Network Management Standards and Models.

**IP Network Management**

Introduction, Configuration Methods, Management Information Base, Simple Network Management Protocol, Extensible Markup Language, Common Object Request Broker Architecture, Configuration Protocols, Statistics collection, Policy Control, IP-Based Service Implementation, OSS, Provisioning Issues, Network Management Issues, OSS Architecture

**SNMP & RMON**

Organization and Information Models, Communication and Functional Models, Features of SNMPv1, SPMPv2 and SNMPv3, RMON SMI and MIB, Features of RMON1 and RMON2.

**Network Management Architecture**

Introduction, Defining Network Management, Network Management Mechanisms, Architectural Considerations.

**MPLS Network Management**

Introduction to MPLS, MPLS Applications, Key Aspects of MPLS Network Management, MIB Modules for MPLS, Overview of MPLS Management Interfaces, SNMP support for MPLS.

**TEXT BOOKS**

1. Farrel et al., "Network Management - know it all", Morgan Kauffman Publishers, Elsevier Press.
2. Subramanian Mani, "Network Management – Principles and Practice", Pearson Education India.
3. Burke Richard, "Network Management – Concepts and Practice", Pearson Education India.

**REFERENCES**

1. An Engineering Approach to Computer Networks-S.Keshav, 2ndEdition, Pearson Education.
2. Understanding communications and Networks,3rd Edition, W.A.Shay,Cengage Learning

**COURSE DESIGNERS**

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| 35021P34 | SOFTWARE TESTING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

The rapid development of automated aids to development and testing increases the need of change from manual testing to automate testing. Effective software testing maintains software quality. Software quality assurance starts from the beginning of a project, right from the analysis phase and thus understanding the role of software testing is very much mandatory. The primary outcome of the course is to provide exposure on research trends in Software Test Automation and Quality Assurance by sharing the research expertise with peers and gain research competence from Industry and Academicians.

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | The students will be able to differentiate between quality control, quality management and quality assurance |
| 2 | The students will be able to discuss the different components of SQA system |
| 3 | The students will be able to discuss different software quality factors models |
| 4 | The students will be able to understand the rational for the SE code of ethics and discuss them |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Various test procesess and continuous quality improvement | Understand |
| **CO2:** Methods of test generation from requirements | Apply |
| **CO3:** Test adequacy assessment using: control flow, data flow, and program mutations | Apply |
| **CO4:** Combinatorial test generation | Analyze |
| **CO5:** Application of software testing techniques in commercial environments | Evaluate |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | | | | L | | | | L | | M | L | | | |
| CO2 | | S | | | | | L | | | | | | | | |
| CO3 | | | S | | L | | | L | | | M | | | | |
| CO4 | | S | | L | | | | | | M | | | | | |
| CO5 | | | | | S | | | | | | M | S | | | |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**PRINCIPLES OF TESTING**

Need for Testing—Psychology of testing—Testing economics—white box testing , Black box testing, Grey box Testing—Retesting regression Testing—Verification and Validation Testing Strategies—Levels of Testing—Unit, Integration ,System Testing, Acceptance Testing .

**TEST CASE DESIGN**

Test case Design Strategies – Using Black Bod Approach to Test Case Design – Random Testing – Requirements based testing – Boundary Value Analysis – Equivalence Class Partitioning – State-based testing – Cause-effect graphing – Compatibility testing – user documentation testing – domain testing – Using White Box Approach to Test design – Test Adequacy Criteria – static testing vs. structural testing – code functional testing – Coverage and Control Flow Graphs – Covering Code Logic – Paths – code complexity testing – Evaluating Test Adequacy Criteria

**LEVELS OF TESTING**

The need for Levers of Testing – Unit Test – Unit Test Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results – Integration tests – Designing Integration Tests – Integration Test Planning – Scenario testing – Defect bash elimination System Testing – Acceptance testing – Performance testing – Regression Testing – Internationalization testing – Ad-hoc testing – Alpha, Beta Tests – Testing OO systems – Usability and Accessibility testing – Configuration testing – Compatibility testing – Testing the documentation – Website testing.

**TEST MANAGEMENT**

People and organizational issues in testing – Organization structures for testing teams – testing services – Test Planning – Test Plan Components – Test Plan Attachments – Locating Test Items – test management – test process – Reporting Test Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist – Skills needed by a test specialist – Building a Testing Group.

**AUTOMATED TESTING AND TEST TOOLS & BUG REPORTING**

Automated Testing and Test Tools: -benefits-Test Tools-Software Test Automation-Bug Bashes and Beta Testing-Writing and Tracking Test Cases: Goals-Test Case Planning Overview-Bug's Life cycle-Bug-Tracking System-Software Quality Assurance.

**9 - hours**

**TEXT BOOKS**


1. Srinivasan Desikan and Gopalaswamy Ramesh, "Software Testing – Principles and Practices", Pearson education, 2006.
2. Aditya P.Mathur, "Foundations of Software Testing", Pearson Education,2008.
3. William Perry, "Effective Methods for Software Testing", Second Edition, John Willey & Sons, 2000.


**REFERENCES**


1. Boris Beizer, "Software Testing Techniques", Second Edition, Dreamtech, 2003
2. Elfriede Dustin, "Effective Software Testing", First Edition, Pearson Education, 2003.
3. RenuRajani, Pradeep Oak, "Software Testing – Effective Methods, Tools and Techniques", Tata McGraw Hill, 2004..


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| 35921P05 | HUMAN COMPUTER INTERACTION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Human-Computer Interaction (HCI) is a multidisciplinary field of study concentrating on the plan of PC innovation and,
Specifically, the association between people (the users) and PCs. While at first worried about PCs, HCI has since extended to cover all types of data innovation plan.

**PREREQUISITE**

NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | Learn the foundations of Human Computer Interaction |
| **2.** | Be familiar with the design technologies for individuals and persons with disabilities |
| **3.** | Be aware of mobile HCI |
| **4.** | To learn the mobile human computer interaction |
| **5.** | Learn the guidelines for user interface |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand the foundations of human computer interaction | Understand |
| **CO2:** Understand fundamental design and evaluation Methodologies of human computer interaction. | Apply |
| **CO3:** Understand the models and theories of HCI | Apply |
| **CO4:** Demonstrate knowledge of human computer interaction design concepts and<br><br>related methodologies | Apply |
| **CO5:** Apply theories and concepts associated with effective work design to real<br>world application and web interface design | Apply |

| COs | PO 1 | PO2 | PO3 | PO4 | PO5 | PO 6 | PO 7 | PO8 | PO9 | PO10 | PO 11 | PO 12 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | L | - | M | | - | M | - | - | - | M | S | S |
| **CO2** | S | S | S | - | M | L | - | L | - | - | - | M | S | M |
| **CO3** | S | S | S | - | M | | - | M | - | - | - | M | S | S |
| **CO4** | S | S | S | - | M | | - | M | - | - | - | M | - | M |
| **CO5** | S | M | M | - | M | | - | M | - | - | - | M | M | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**FOUNDATIONS OF HCI**

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

**DESIGN & SOFTWARE PROCESS**

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

**MODELS AND THEORIES**

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models-Hypertext, Multimedia and WWW.

**MOBILE HCI**

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

**WEB INTERFACE DESIGN**

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow. Case Studies.

**TEXT BOOKS**

1. Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, "Human Computer Interaction", 3rd Edition, Pearson Education, 2004 (UNIT I , II &III)
2. Brian Fling, "Mobile Design and Development", First Edition , O"Reilly Media Inc., 2009 (UNIT–IV)

**REFERENCES**

1. Bill Scott and Theresa Neil, "Designing Web Interfaces", First Edition, O"Reilly, 2009.(UNIT-V).

**COURSE DESIGNERS**

| S. No. | Name of the Faculty | Designation | Department / Name of the College | Mail ID |
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| 35021P04 | BLOCK CHAIN TECHNOLOGY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Block chain has the potential to change almost every industry. It can create a more efficient and prosperous world where people can connect with each other without the need for intermediaries This course will give awareness of the new challenges that exist in monetizing businesses around block chains and smart contracts

**PREREQUISITE–NIL**

**COURSEOBJECTIVES**

| | |
|---|---|
| **1.** | It provides the function of Block chain as a method of securing distributed ledgers, how consensus on their contents is achieved, and the new applications that they enable |
| **2.** | It covers the technological underpinnings of block chain operations as distributed data structures and decision making systems. |
| **3.** | It provides a critical evaluation of existing "smart contract" capabilities and platforms. |

**COURSEOUTCOMES**

On the successful completion of the course,students will be able to Understand the structure of a block chain

| | |
|---|---|
| Understand the structure of a block chain | Understand |
| Understand what constitutes a "smart" contract, what are its legal implications and what it can and cannot do, now and in the near future, | Understand & Apply |
| Evaluate the setting where a block chain based structure may be applied, itspotential and its limitations | Evaluate |
| Analyze the incentive structure in a block chain based system and critically assess its functions, benefits and vulnerabilities; | Analyze |
| Analyze to what extent smart and self-executing contracts can benefit automation, governance, transparency and the Internet of Things (IOT), | Analyze |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO2 | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO3 | M | M | S | M | - | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |

S-Strong;M-Medium;L-Low

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**SYLLABUS**

**INTRODUCTION**

An Overview of Bit coin -Alternative coins and networks-Bit coin versus Cryptocurrencies versus Block chain-Distributed Ledger Technology (DLT)- Hyper Ledger- Ethereum.

**TRUST AND VUNERABILITY**

Short history of the scaling out of human trust, high and Low trust societies, Types of Trust model: Peer-to-Peer, Leviathan, and Intermediary, Cryptocurrency and Markets.

**BLOCKCHAIN AND ITS TYPES**

How Block chain (and Bitcoin) Work, Peer to Peer network, Bitcoin and block sizes, Mining andCryptocurrencies, Types of Block chain and Enterprise, Public and Private Block chain.

**CONSENSUS**

Consensus Building, Problems with Block chain, Bitcoin and Ethereum

**BLOCKCHAIN APPLICATIONS**

Use Cases: Open Bazaar and Safe market as decentralized information and reputation (super) marketplaces,reputation brokerages and smart dark net marketplaces (Daemon), Additional functions of decentralized markets
beyond mere products.

**TEXTBOOKS**

**1**.Block chain: Blueprint for a New Economy 1st Edition by Melanie Swan

**REFERENCES**

1. "Mastering Bitcoin: Unlocking digital cryptocurrencies", by Andreas M.AntonopoulosJamesDoveyandAshFurrow,"BeginningObjectiveC",Apress,2012.
2. "Ethereum: Blockchains, Digital Assets, Smart Contracts, Decentralized Autonomous Organizations", by Henning Diedrich

**CourseDesigners:**



| S.No. | NameoftheFaculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| 35021P19 | GO PROGRAMMING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE:**
GO Programming Language for statistical data manipulation and analysis. It was inspired by and is most compatible with the statistical language.

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn GO Programming Language |
| 2 | To Study Object Oriented Programming |
| 3 | To Study Functional Programming |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** To Understand the basics in GO programming language in terms of constructs, control statements, string functions | Understand & Apply |
| **CO2:** To Understand the use of GO Programming fundamentals. | Understand & Apply |
| **CO3:** Learn to apply GO programming for Communicating Sequential Process | Understand & Apply |
| **CO4**: Able to appreciate and apply the GO programming from a statistical perspective | Understand & Apply |
| **CO5:** To learn GO programming Variables | Understand & Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | M | L | S | S | M | S | L | S | S | - | - | - |
| CO2 | M | S | M | M | M | S | S | M | S | M | M | M | - | - | - |
| CO3 | S | S | S | S | M | S | S | S | S | M | S | S | - | - | - |
| CO4 | S | S | S | M | M | S | S | S | S | L | S | S | - | - | - |
| CO5 | S | S | M | M | L | S | M | M | S | L | M | S | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**INTRODUCTION**

Introducing to Go Programming – Command-Line Arguments – Finding Duplicate Lines – Animated GIFs – Fetching a URL – Fetching URLs Concurrently – A Web Server – Loose Ends – Names – Declarations – Variables – Integers – Floating-Point Numbers - Complex Numbers – Booleans – Strings.

**FUNCTIONS**

Function Declarations - Arrays – Slices – Maps – Structs – JSON – Text and HTML Templates – Recursion – Multiple Return Values – Function Values – Anonymous Functions – Variadic Functions – Deferred Function Calls – Methods and Declarations - Encapsultion

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**INTERFACES, GOROUTINES & CHANNELS**

Interfaces Types, Contracts, Satification – Interface Values – Assertions Types – Discriminating Errors with Type Assertions – Querying Behaviours with Interface Type Assertions – Types of Switches – Goroutines – Goroutines Channel – Looping in Parallel - Multiplexing.

**CONCURRENCY WITH SHARED VARIABLES, PACKAGES , THE GO TOOL**

Race Conditions – Mutual Exclusion – Read/Write Mutexes, Memory Synchronization – Lazy Initialization – The Race Detector – Grountines and Threads – Import Paths – The Package Declaration – Blank Reports – Packages and Naming – The Go Tools.

**REFLECTION, LOW-LEVEL PROGRAMMING**

Introduction – A recursive value printer – Setting Variables – Accessing Struct Field Tags – Displaying the Methods of a Type – A Word of Caution.

**TEXT BOOKS:**

1. The Go Programming Language, Alan A.A. Donovan, Brian W. Kernighan , Addison – Welsey Professional Computing Series, 2015.
2. The Go Programming Language, David Chisnall , 2012.

**REFERENCES:**

1. Cocoa Programming Developer's,Pearson Education, 2009.
2. Introducing GO, Caleb Doxey, O'Reilly Media, 2016

**COURSE DESIGNERS**

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| 35021P28 | R PROGRAMMING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE:**
R is a scripting language for statistical data manipulation and analysis. It was inspired by and is most compatible with the statistical language.

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn R Programming |
| 2 | To Study Object Oriented Programming |
| 3 | To Study Functional Programming |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** To Understand the basics in R programming in terms of constructs, control statements, string functions | Understand & Apply |
| **CO2:** To Understand the use of R for Big Data analytics | Understand & Apply |
| **CO3:** Learn to apply R programming for Text processing | Understand & Apply |
| **CO4**: Able to appreciate and apply the R programming from a statistical perspective | Understand & Apply |
| CO5: To learn Big Data | Understand & Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | M | L | S | S | M | S | L | S | - | - | - | - |
| CO2 | M | S | M | M | M | S | S | M | S | M | M | - | - | - | - |
| CO3 | S | S | S | S | M | S | S | S | S | M | S | - | - | - | - |
| CO4 | S | S | S | M | M | S | S | S | S | L | S | - | - | - | - |
| CO5 | S | S | M | M | L | S | M | M | S | L | M | - | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**INTRODUCTION**

Introducing to R – R Data Structures – Help functions in R – Vectors – Scalars – Declarations – recycling – Common Vector operations – Using all and any – Vectorized operations – NA and NULL values – Filtering – Vectorised if-then else – Vector Equality – Vector Element names

**MATRICES, ARRAYS AND LISTS**

Creating matrices – Matrix operations – Applying Functions to Matrix Rows and Columns – Adding and deleting rows and columns – Vector/Matrix Distinction – Avoiding Dimension Reduction – Higher Dimensional arrays – lists – Creating lists – General list operations – Accessing list components and values – applying functions to lists – recursive lists

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**DATA FRAMES**

Creating Data Frames – Matrix-like operations in frames – Merging Data Frames – Applying functions to Data frames – Factors and Tables – factors and levels – Common functions used with factors – Working with tables - Other factors and table related functions - Control statements – Arithmetic and Boolean operators and values – Default values for arguments - Returning Boolean values – functions are objects – Environment and Scope issues – Writing Upstairs - Recursion – Replacement functions – Tools for composing function code – Math and Simulations in R

**OOP**

S3 Classes – S4 Classes – Managing your objects – Input/Output – accessing keyboard and monitor – reading and writing files – accessing the internet – String Manipulation – Graphics – Creating Graphs – Customizing Graphs – Saving graphs to files – Creating three-dimensional plots

**INTERFACING**

Interfacing R to other languages – Parallel R – Basic Statistics – Linear Model – Generalized Linear models – Non-linear models – Time Series and Auto-correlation – Clustering

**TEXT BOOKS:**

1. The Art of R Programming: A Tour of Statistical Software Design, Norman Matloff, No Starch Press, 2011
2. R for Everyone: Advanced Analytics and Graphics, Jared P. Lander, Addison-Wesley Data & Analytics Series, 2013.

**REFERENCES:**

1. Beginning R – The Statistical Programming Language, Mark Gardener, Wiley, 2013.
2. Introductory R: A Beginner's Guide to Data Visualisation, Statistical Analysis and Programming in R, Robert Knell, Amazon Digital South Asia Services Inc, 2013

1.

**COURSE DESIGNERS**

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| 35021P30 | RICH INTERNET APPLICATION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Uses of web sites and portals have become common for knowledge sharing and business. The course focuses on the fundamentals of CGI, SCRIPTING LANGUAGES, Web Applications.

**PREREQUISITE:Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To learn CGI Concepts & CGI Programming |
| 2. | To Study DHTML, XML,AJAX |
| 3. | To Study On-Line web application & Internet Concepts |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** To understand the basic concept of HTML and Scripting Language | Understand |
| **CO2:** To learn the HTML, Common Gateway Interface. | Apply |
| **CO3:** To learn the Java Script and AJAX | Apply |
| **CO4**: To learn the Server side programming | Apply |
| CO5: To learn the database connectivity. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO2 | M | M | M | M | - | - | - | - | - | - | - | - | M | M | M |
| CO3 | M | M | S | M | - | - | - | - | - | - | - | - | M | M | M |
| CO4 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |
| CO5 | S | M | M | M | - | - | - | - | - | - | - | - | M | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Internet Principles – Basic Web Concepts – Client/Server model – retrieving data from Internet – HTML and Scripting Languages – Standard Generalized Mark –up languages – Next Generation – Internet –Protocols and Applications

**COMMON GATEWAY INTERFACE PROGRAMMING**

HTML forms – CGI Concepts – HTML tags Emulation – Server – Browser Communication – E-mail generation – CGI client Side applets – CGI server applets – authorization and security. Introduction to PERL

**SCRIPTING LANGUAGES**

Java Script Programming-Dynamic HTML-Cascading style sheets-Object model and Event model- Filters and Transitions-Active X Controls-Multimedia-Client side script.- Traditional web application vs AJAX application – creating full scale AJAX application - Forms – Scripting Object

**SERVER SIDE PROGRAMMING**

Dynamic Web content – cascading style sheets – DHTML – XML – Server side includes – communication – Active and Java Server Pages - Ruby enabled applications

**ONLINE**

Simple applications – on-line databases – monitoring user events – plug-ins –database connectivity – Internet Information Systems – MICROSOFT IIS - EDI application in business – Internet Commerce – Customization of Internet Commerce

**TEXT BOOK**


1. Jason Hunter, William Crawford, “Java Servlet Programming”, O’ Reilly Publications, 1999.
2. Ravi Kalakota and Andrew B Whinston, “Frontiers of Electronic Commerce”, Addison Wesley, 1996
3. Eric Ladd, Jim O’ Donnel, “Using HTML 4, XML and Java”, Prentice Hall of India – QUE,1999
4. Paul JDeitel and Harvey M Deitel, "AJAX, Rich Internet appliactions and web development", Prentice Hall, 2008.


**REFERENCES**


1. Jeffy Dwight, Michael Erwin and Robert Niles, “Using CGI”, Prentice Hall of India QUE, 2010
2. Scot Johnson, Keith Ballinger, Davis Chapman, “Using Active server Pages”, Prentice Hall of India, 1999
3. Ted coombs, Jason coombs , Brewer, “ Active X source book”, John wiley, 1999
4. Evangelos Petroutsos , “ Mastering Visual Basic 6”, BPB Publications, 1998


**COURSE DESIGNERS**


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| 35021P27 | OBJECT ORIENTED ANALYSIS AND DESIGN | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 2 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enable them to lean about basic concepts of designing object oriented systems and its application in Programming. This syllabus helps the students to develop software by identifying and implementing a set of objects and their interactions to meet the desired objectives.

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To impart basic knowledge in analyzing the software systems so that the student will understand the object oriented concepts and they can design the object oriented systems effectively. |
| 2. | To inculcate the knowledge of various UML (Unified Modeling language)diagrams |
| 3. | To lay foundation for practical applications of object oriented concepts in programming aspects |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** To learn about various UML diagrams and design patterns | Understand |
| **CO2:** To do case study on various real time systems and applying design patterns | Apply |
| **CO4:** To Practice the for the basic concepts | Apply |
| **CO4:** To implement the design to code and perform testing | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | L | M | - | - | - | - | - | - | M | S | M | - |
| CO2 | S | M | M | M | M | - | - | - | M | - | - | M | S | M | M |
| CO3 | S | M | S | S | M | - | - | - | - | - | - | L | S | M | M |
| CO4 | S | M | M | | M | - | - | - | L | - | M | L | S | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION TO OOAD**

Introduction to OOAD – Unified Process - UML diagrams – Use Case – Class Diagrams– Interaction Diagrams – State Diagrams – Activity Diagrams – Package, component and Deployment Diagrams.

**DESIGN PATTERNS**

GRASP: Designing objects with responsibilities – Creator – Information expert – Low Coupling – High Cohesion – Controller – Design Patterns – creational – factory method – structural – Bridge – Adapter – behavioral – Strategy – observer

**CASE STUDY**

Case study – the Next Gen POS system, Inception –Use case Modeling – Relating Use cases – include, extend and generalization – Elaboration – Domain Models – Finding conceptual classes and description classes – Associations – Attributes – Domain model refinement – Finding conceptual class Hierarchies – Aggregation and Composition

**APPLYING DESIGN PATTERNS**

System sequence diagrams – Relationship between sequence diagrams and use cases Logical architecture and UML package diagram – Logical architecture refinement – UML class diagrams – UML interaction diagrams – Applying GoF design patterns

**CODING AND TESTING**

Mapping design to code – Testing: Issues in OO Testing – Class Testing – OO Integration Testing – GUI Testing – OO System Testing

**TEXT BOOKS**

1. Craig Larman, "Applying UML and Patterns: An Introduction to Object-Oriented Analysis and Design and Iterative Development‖, Third Edition, Pearson Education

2.Object Oriented Analysis And Design By Brahama Dathan & Sranath Ramnath

**REFERENCES**

1. Simon Bennett, Steve Mc Robb and Ray Farmer, ―Object Oriented Systems Analysis and Design Using UML‖, Fourth Edition, Mc-Graw Hill Education
2. . Erich Gamma, and Richard Helm, Ralph Johnson, John Vlissides, "Design patterns: Elements of Reusable Object-Oriented Software‖, Addison-Wesley

Martin Fowler, ―UML Distilled: A Brief Guide to the Standard Object Modeling Language‖, Third edition, Addison Wesley

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| 35021P18 | GAME THEORY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enable them to understand the basics of Game Theory

**PREREQUISITE:** ENGINEERING MATHAMATICS

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To introduce the student to the notion of a game, its solutions concepts, and other basic notions and |
| 2 | To study tools of game theory, and the main applications for which they are appropriate, including electronic trading markets |
| 3 | To formalize the notion of strategic thinking and rational choice by using the tools of game theory, and to provide insights into using game theory in modeling applications |
| 4 | To draw the connections between game theory, computer science, and economics, especially emphasizing the computational issues |
| 5 | To introduce contemporary topics in the intersection of game theory, computer science, and economics |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Explain the concept of basic notion of a game, its solutions concepts, and other issues | Understand |
| **CO2:** Develop a strategic game theory with perfect information | Apply |
| **CO3:** Analyze a formal notion of strategic thinking and rational choice by using tools of game theory | Analyze |
| **CO4:** Indentify the non-cooperative game theory form. | Apply |
| **CO5:** Analyze the connections between game theory, computer science, and economics, especially emphasizing the computational issues | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | - | - | M | M | - | - | L | - | L | - | - | **S** | M | M |
| **CO2** | M | - | - | M | L | - | S | - | - | M | - | - | **S** | - | - |
| **CO3** | S | M | M | M | L | - | - | - | - | L | S | L | - | S | - |
| **CO4** | S | M | M | S | M | - | - | M | - | M | - | - | - | - | M |
| **CO5** | S | M | M | M | M | - | - | - | - | M | - | L | M | S | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Making rational choices: basics of Games – strategy - preferences – payoffs – Mathematical basics - Game theory – Rational Choice - Basic solution concepts-non cooperative versus cooperative games - Basic computational issues - finding equilibria and learning in games- Typical application areas for game theory (e.g. Google's sponsored search, eBay auctions, electricity trading markets).

**GAMES WITH PERFECT INFORMATION**

Games with Perfect Information - Strategic games - prisoner's dilemma, matching pennies Nash equilibria-theory and illustrations - Cournot's and Bertrand's models of oligopoly- auctions mixed strategy equilibrium-zero-sum games- Extensive Games with Perfect Information repeated games (prisoner's dilemma)- subgame perfect Nash equilibrium; computational issues.

**GAMES WITH IMPERFECT INFORMATION**

Games with Imperfect Information - Bayesian Games – Motivational Examples – General Definitions – Information aspects – Illustrations - Extensive Games with Imperfect -Information - Strategies- Nash Equilibrium – Beliefs and sequential equilibrium – Illustrations - Repeated Games – The Prisoner's Dilemma – Bargaining.

**NON-COOPERATIVE GAME THEORY**

Non-cooperative Game Theory - Self-interested agents- Games in normal form - Analyzing games: from optimality to equilibrium - Computing Solution Concepts of Normal-Form Games – Computing Nash equilibria of two-player, zero-sum games -Computing Nash equilibria of two player, general-sum games -Identifying dominated strategies.

**MECHANISM DESIGN**

Aggregating Preferences-Social Choice – Formal Model- Voting - Existence of social functions - Ranking systems - Protocols for Strategic Agents: Mechanism Design - Mechanism design with unrestricted preferences- Efficient mechanisms - Vickrey and VCG mechanisms (shortest paths) - Combinatorial auctions - profit maximization Computational applications of mechanism design - applications in Computer Science - Google's sponsored search - eBay auctions.

**TEXT BOOKS**

1. Cay S. Horstmann and Gary Cornell, "Core Java: Volume I – Fundamentals", Eighth Edition, Sun Microsystems Press, 2008.

**REFERENCES**

1. James E. Smith, Ravi Nair, "Virtual Machines: Versatile Platforms for Systems and Processes", Elsevier/Morgan Kaufmann, 2005.
2. David Marshall, Wade A. Reynolds, "Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center", Auerbach Publications, 2006.
3. Kumar Reddy, Victor Moreno, "Network virtualization", Cisco Press, July, 2006.
4. Chris Wolf, Erick M. Halter, "Virtualization: From the Desktop to the Enterprise", APress 2005.
5. Kenneth Hess , Amy Newman, "Practical Virtualization Solutions: Virtualization from the Trenches", Prentice Hall, 2010.

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| 35021P20 | INFORMATION RETRIEVAL TECHNIQUES | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enable them to understand the basics of Information Retrieval with pertinence to modeling, query operations and indexing.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn about the basic concepts, practical issues and impact of the web on Information Retrieval |
| 2 | To understand about the various IR models |
| 3 | To get an understanding of machine learning techniques for text classification and clustering |
| 4 | To understand the various applications of Information Retrieval giving emphasis to Multimedia IR |
| 5 | To lay foundation for learning the concepts of digital libraries |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Describe the objectives of information retrieval systems | Understand |
| **CO2:** Understand about the various IR models | Apply |
| **CO3:** Understand the static and dynamic indices and query operations | Apply |
| **CO4**: implement clustering algorithms like hierarchical clustering and classification | Apply |
| **CO5:** Able to Understand searching ,ranking and digital libraries | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | - | M | M | M | - | - | - | - | - | M | S | S | S |
| **CO2** | S | S | S | M | M | L | - | M | - | - | - | M | S | M | M |
| **CO3** | S | L | L | - | L | - | - | - | - | - | - | S | M | S | S |
| **CO4** | S | S | S | M | M | M | - | M | - | - | - | M | S | - | S |
| **CO5** | S | S | M | M | M | L | - | - | - | - | - | M | M | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Motivation – Basic Concepts – Practical Issues - Retrieval Process – Architecture - Boolean Retrieval – Retrieval Evaluation – Open Source IR Systems–History of Web Search – Web Characteristics–The impact of the web on IR —IR Versus Web Search–Components of a Search engine.

**MODELING**

Taxonomy and Characterization of IR Models – Boolean Model – Vector Model - Term Weighting – Scoring and Ranking –Language Models – Set Theoretic Models - Probabilistic Models – Algebraic Models – Structured Text Retrieval Models – Models for Browsing.

**INDEXING**

Static and Dynamic Inverted Indices – Index Construction and Index Compression. Searching - Sequential Searching and Pattern Matching. Query Operations -Query Languages – Query Processing - Relevance Feedback and Query Expansion - Automatic Local and Global Analysis – Measuring Effectiveness and Efficiency.

**CLASSIFICATION AND CLUSTERING**

Text Classification and Naïve Bayes – Vector Space Classification – Support vector machines and Machine learning on documents. Flat Clustering – Hierarchical Clustering –Matrix decompositions and latent semantic indexing – Fusion and Meta learning.

**SEARCHING AND RANKING**

Searching the Web –Structure of the Web –IR and web search – Static and Dynamic Ranking - Web Crawling and Indexing – Link Analysis - XML Retrieval Multimedia IR: Models and Languages – Indexing and Searching Parallel and Distributed IR – Digital Libraries.

**TEXT BOOKS**

1. Ricardo Baeza – Yates, BerthierRibeiro – Neto, Modern Information Retrieval: The concepts and Technology behind Search (ACM Press Books), Second Edition

2.Textbook Retrieval Systems In Information Management by GG Chowdhury

**REFERENCES**

1. Christopher D. Manning, PrabhakarRaghavan, HinrichSchutze, Introduction to Information Retrieval, Cambridge University Press, First South Asian Edition

2. Stefan Buttcher, Charles L. A. Clarke, Gordon V. Cormack, Information Retrieval Implementing and Evaluating Search Engines, The MIT Press, Cambridge.

**COURSE DESIGNERS**

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| 35021P33 | SOFTWARE QUALITY MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

Software Testing and Quality Assurance is predominant for the smartness of the Software system. Software testing is a critical element of software quality assurance and represents the ultimate review of specification, design and coding. The real challenge to deliver successful software product relies on sound testing strategies and tools.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | The students will be able to differentiate between quality control, quality management and quality assurance |
| 2 | The students will be able to discuss the different components of SQA system |
| 3 | The students will be able to discuss different software quality factors models |
| 4 | The students will be able to understand the rational for the SE code of ethics and discuss them |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** An ability to understand the quality management in software | Understand |
| **CO2:** To analyze the different types of models for quality assurance | Analyze |
| **CO3:** To demonstrate software quality infrastructures. | Apply |
| **CO4:** To measure various business process re engineering. | Apply |
| **CO5:** To know how to prevent the defects. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PS01 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | - | M | M | - | - | - | - | - | - | S | - | S | S |
| **CO2** | S | S | S | M | M | - | - | M | - | - | - | S | - | M | S |
| **CO3** | S | M | S | M | M | - | - | - | - | - | - | S | - | M | S |
| **CO4** | S | M | S | - | L | - | - | L | - | - | - | S | - | M | S |
| **CO5** | S | M | S | - | M | - | - | L | - | - | - | S | - | M | S |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE**

Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall‟s quality model – SQA system and architecture – Software Project life cycle Components – Pre-project quality components – Development and quality plans

**SQA COMPONENTS AND PROJECT LIFE CYCLE**

Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management

**SOFTWARE QUALITY INFRASTRUCTURE**

Procedures and work instructions – Templates – Checklists – 3S developmenting – Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit -Documentation control – Storage and retrieval.

**SOFTWARE QUALITY MANAGEMENT & METRICS**

Project process control – Computerized tools – Software quality metrics – Objectives of quality measurement – Process metrics – Product metrics – Implementation – Limitations of software metrics – Cost of software quality – Classical quality cost model – Extended model – Application of Cost model.

**STANDARDS, CERTIFICATIONS & ASSESSMENTS**

Quality management standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies – Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

**TEXT BOOKS**

1. DanielGalin, “Software Quality Assurance”, Pearson Publication, 2009.

**REFERENCES**

1. Alan C. Gillies, “Software Quality: Theory and Management”, International Thomson Computer Press, 1997.
2. Mordechai Ben-Menachem “Software Quality: Producing Practical Consistent Software”, International Thompson Computer Press, 1997.

**COURSE DESIGNERS**

| S. No. | Name of the Faculty | Designation | Department | Mail ID |
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| 35121P01 | NETWORK PROTOCOL AND PROGRAMMING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

The purpose of this course is to understand the concepts of network programming using the network protocols such us TCP, UDP and sockets. Creates the simple network management for routing. Trace and monitoring the flow of information from one node to another node in the network.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Learn the basics of socket programming using TCP Sockets. |
| 2 | Learn about Socket Options. |
| 3 | To explore the features of raw sockets. |
| 4 | To learn and develop macros for including objects in MIB structure |
| 5 | To have knowledge on various network management tools |

**COURSE OUTCOMES**

On successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Implement client/server communications using TCP and UDP Sockets | Remember and Understand |
| CO2. Describe the usage of socket options for handling various Sockets in programming | Remember and Understand |
| CO3. Understand handling of raw sockets | Understand |
| CO4. Explain functionalities of SNMP and MIB structure. | Understand, Apply, analyse and evaluate |
| CO5. Experiment with various tools available to manage a network | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | S | M | - | - | - | M | - | M | M | | | |
| CO2 | S | M | L | M | S | - | - | - | - | - | M | M | | | |
| CO3 | S | S | S | - | M | - | - | - | M | - | L | | | | |
| CO4 | S | S | S | - | S | M | - | - | M | - | M | M | | | |
| CO5 | S | | M | - | M | - | - | - | M | L | M | M | | | |

S- Strong; M-Medium; L-Low

Sockets and Application Development

Introduction to Socket Programming – System Calls – Address Conversion Functions -POSIX Signal Handling – Server with Multiple Clients – Boundary Conditions – Server Process Crashes, Server Host Crashes, Server Crashes and Reboots, Server Shutdown -I/O Multiplexing – I/O Models – TCP Echo Client/Server with I/O Multiplexing.

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SOCKET OPTIONS

Socket options – getsockopt and set sockopt functions – Generic socket options – IP socket options – ICMP socket options – TCP socket options – Multiplexing TCP and UDP sockets – SCTP Sockets – SCTP Client/server – Streaming Example – Domain name system – gethostbyname, gethostbyaddr, getservbyname and getservbyport functions – Protocol Independent functions in TCP Client/Server Scenario

ADVANCED SOCKETS

IPv4 and IPv6 interoperability – Threaded servers – Thread creation and termination – TCP echo server using threads – Mutex – Condition variables – Raw sockets – Raw socket creation – Raw socket output – Raw socket input – ping program – trace route program

SIMPLE NETWORK MANAGEMENT

SNMP Network Management Concepts – SNMPv1 – Management Information – MIB Structure – Object Syntax – Standard MIB's – MIB–II Groups – SNMPv1 Protocol and Practical Issues – Overview of RMON – Statistics and Collection – Alarms and Filters.

Unit V

Network Management Tools and Systems

System Utilities – Network Status Tools – Traffic monitoring Tools – Network Routing Tools – SNMP Tools – Network Statistics measurement systems – NMS Design – Network Management Systems.

Text Books:


1. W. Richard Stevens, "UNIX Network Programming Vol I", Third Edition, PHI/ Pearson Education, 2003.
2. William Stallings, "SNMP, SNMPv2, SNMPv3 and RMON 1 and 2", Third Edition, Pearson Education, 2009.


References:


1. D.E. Comer, "Internet working with TCP/IP , Vol-I", Sixth Edition, Pearson Edition, 2013.
2. D. E. Comer, "Internet working with TCP/IP Vol-III: Client-Server Programming and Application BSD Sockets Version", Second Edition, Pearson Education, 2003.
3. Mani Subramanian, "Network Management – Principles and Practice", Second Edition, Pearson Education, 2013.


COURSE DESIGNERS


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| 35021P31 | SCALA PROGRAMMING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

The purpose of this course is to introduce scala programming a remarkably powerful functional programming language to write code for data analysis and machine learning, distributed computing and web development.

**PRERQUISITE :** JAVA Programming

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | To provide basic knowledge on Scala programming concepts. |
| **2.** | To evaluate the different operations of functions |
| **3.** | To Create lists and tuples, evaluate its operations |
| **4.** | To Create patterns and match the same with traits and case classes |
| **5.** | To learn about monads and functors |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Comprehend the usage of of basic constructs of a functional programming language | Understand |
| **CO2.** Apply the different operations involved in functional data structures . | Apply |
| **CO3.** Evaluate the operations on lists and tuples. | Apply. |
| **CO4.**Apply the traits and case classes operations. | Apply. |
| **CO5.** Comprehend about monads and functors | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | M | M | - | - | - | - | - | - | - | M | S | M |
| CO2 | S | S | M | M | M | - | - | - | - | - | - | - | M | S | M |
| CO3 | M | S | S | M | M | - | - | - | - | - | - | - | M | M | S |
| CO4 | S | S | M | S | M | - | - | - | - | - | - | - | S | S | M |
| CO5 | S | S | S | M | M | - | - | - | - | - | - | - | S | S | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION**

Non- Functional programming -Functional programming-Benefits of Functional Programming in Scala-Referential Transparency- Modules- Objects-Namespaces -Basic Functions-Polymorphic functions-Tail calls

**PATTERN MATCHING**

Defining functional data structures-Pattern Matching-Variadic functions in Scala-Data sharing in functional data structures-Recursion over lists-Generalizing to higher order functions

**LISTS AND TUPLES**

Basic operations on lists- Strict and non-strict functions-Lazy Lists Example- Infinite Steams and co recursion-Tuples- Basic operations on tuples.

**TRAITS**

Traits – Purpose and Syntax- Interface types- Ordered trait- Traits for modifying interfaces- Stacking modifications-Traits and operations

**MONADS AND FUNCTORS**

Monad Laws-Generalizing monads- Applicative trait Monads vs Applicative functors- Functor Laws - Traversable functors-Uses of Traverse.

**TEXT BOOKS**:

1. Paul Chiusano and Rúnar Bjarnason, “Functional Programming in Scala”, Manning Publishers, 2014.

2. Dean Wampler, Alex Payne, “Programming Scala”, O'Reilly Media, 2009.

**REFERENCES:**

1. Oderskey M,SpoonL,VennersB,—ProgramminginScala‖,Thirdedition.
2. Hortsmann, C., Scala for the Impatient, 2nd ed., Addison-Wesley,2016.

**COURSE DESIGNERS**



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| 35121P02 | SERVICE ORIENTED ARCHITECTURE | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

To provide an overview of Service Oriented Architecture and enable the student to create applications in a collaborative environment.

**PREREQUISITE :Nil**

**COURSE OBJECTIVES**

1. To study the importance of Service Oriented Architecture.
2. Implementation of SOA in the Java and .NET frameworks.
3. To study the advanced features of SOA.
4. To learn about soa
5. To learn about different web services in soa

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** To learn the basics of .net Frame work | Understand |
| **CO2.** To learn SOA elements and java concepts | Apply |
| **CO3.** To learn interface and inheritance concepts | Analyze |
| **CO4.** To learn fundamentals of window application programming and create a window application | Apply |
| **CO5.** To develop web applications and learn advanced | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO6. | S | M | M | M | M | - | - | - | - | - | - | - | M | - | - |
| CO7. | S | M | M | L | L | - | - | - | - | - | - | - | M | M | M |
| CO8. | S | M | S | | M | - | - | - | - | - | - | - | M | M | M |
| CO9. | S | M | L | | M | - | - | - | - | - | - | - | M | M | - |
| CO10. | S | M | L | L | M | - | - | - | - | - | - | - | S | M | - |

S- Strong; M-Medium; L-Low

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UNIT I 9

Introduction – Service Oriented Enterprise – Service Oriented Architecture (SOA) – SOA and Web Services – Multi-Channel Access – Business Process management – Extended Web Services Specifications – Overview of SOA – Concepts – Key Service Characteristics – Technical Benefits –

Business Benefits

UNIT II 9

SOA and Web Services – Web Services Platform – Service Contracts – Service-Level Data Model –

Service Discovery – Service-Level Security – Service-Level Interaction patterns – Atomic Services and

Composite Services – Proxies and Skeletons – Communication – Integration Overview – XML and Web

Services - .NET and J2EE Interoperability – Service-Enabling Legacy Systems – Enterprise Service Bus

Pattern

UNIT III 9

Multi-Channel Access – Business Benefits – SOA for Multi Channel Access – Tiers – Business Process

Management – Concepts – BPM, SOA and Web Services – WSBPEL – Web Services Composition

UNIT IV 9

Java Web Services – JAX APIs – JAXP – JAX-RPC – JAXM – JAXR – JAXB

UNIT V 9

Metadata Management – Web Services Security – Advanced Messaging – Transaction Management

TOTAL: 45 PERIODS

TEXTBOOKS:

1. Eric Newcomer, Greg Lomow, “Understanding SOA with Web Services”, Pearson Education, 2005.

2. James McGovern, Sameer Tyagi, Michael E Stevens, Sunil Mathew, “Java Web Services Architecture”, Elsevier, 2003. (Unit 4)

REFERENCES:

1. Thomas Erl, “Service Oriented Architecture”, Pearson Education, 2005.

2. Frank Cohen, “FastSOA”, Elsevier, 2007.

3. Scott Campbell, Vamsi Mohun, “Mastering Enterprise SOA”, Wiley, 2007.

4. Eric Pulier, Hugh Taylor, “Understanding Enterprise SOA”, Dreamtech

5. Press, 2007.

6. Jeff Davies, “The Definitive Guide to SOA”, Apress, 2007.

7. Sandeep Chatterjee, James Webber, “Developing Enterprise Web

8. Services”, Pearson Education, 2004.

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| COURSE DESIGNERS | | | |
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| 35021P11 | DATA SCIENCE IN PYTHON | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This will introduce the learner to the basics of the python programming environment, including fundamental python programming techniques such as lambdas, reading and manipulating csv files, and the numpy library. The course will introduce data manipulation and cleaning techniques using the popular python pandas data science library and introduce the abstraction of the Series and Data Frame as the central data structures for data analysis, along with tutorials on how to use functions such as groupby, merge, and pivot tables effectively.

**PREREQUISITE :Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To provide knowledge of python programming paradigms required for Data Science. |
| 2. | Produce Python code to statistically analyze a dataset. |
| 3. | To provide the knowledge of NumPy Packages |
| 4. | To provide the knowledge of Pandas, MatplotLib |
| 5. | Critically evaluate data visualizations based on their design and use for communicating stories from data. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand and demonstrate the usage of built-in objects in Python | Understand |
| **CO2:** Analyze the significance of python program development environment and apply it to solve real world applications | Analyze |
| **CO3:** Implement numerical programming. | Apply |
| **CO4:** Implement data handling visualization through NumPy | Apply |
| **CO5:** Implement Pandas and MatplotLib modules. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | M | S | | | | | | | | | | M | | |
| CO2 | M | M | S | | M | M | | | | | | | M | M | M |
| CO3 | S | M | M | M | M | L | | | | | | | M | | |
| CO4 | S | M | M | M | M | | | | | | | | M | M | M |
| CO5 | S | M | S | M | M | M | | | | | | | M | | |

S- Strong; M-Medium; L-Low

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## SYLLABUS

### UNIT I INTRODUCTION TO PYTHON

Structure of Python Program-Underlying mechanism of Module Execution-Branching and Looping-Problem Solving Using Branches and Loops-Functions - Lists and Mutability- Problem Solving Using Lists and Functions

### UNIT II SEQUENCE DATATYPES AND OBJECT-ORIENTED PROGRAMMING

Sequences, Mapping and Sets- Dictionaries- -Classes: Classes and Instances-Inheritance- Exceptional Handling- Introduction to Regular Expressions using "re" module.

### UNIT III USING NUMPY

Basics of NumPy-Computation on NumPy-Aggregations-Computation on Arrays- Comparisons, Masks and Boolean Arrays-Fancy Indexing-Sorting Arrays-Structured Data: NumPy's Structured Array.

### UNIT IV DATA MANIPULATION WITH PANDAS –I

Introduction to Pandas Objects-Data indexing and Selection-Operating on Data in Pandas- Handling Missing Data-Hierarchical Indexing - Combining Data Sets - Aggregation and Grouping-Pivot Tables-Vectorized String Operations - Working with Time Series-High Performance Pandas- and query()

### UNIT V VISUALIZATION AND MATPLOTLIB

Basic functions of matplotlib-Simple Line Plot, Scatter Plot-Density and Contour Plots- Histograms, Binnings and Density-Customizing Plot Legends, Colour Bars-Three- Dimensional Plotting in Matplotlib

**TEXT BOOK:**

1. Jake VanderPlas ,Python Data Science Handbook - Essential Tools for Working with Data, O'Reily Media,Inc, 2016
2. Zhang.Y ,An Introduction to Python and Computer Programming, Springer Publications,2016

**REFERENCES:**

1. Joel Grus ,Data Science from Scratch First Principles with Python, O'Reilly Media,2016.
2. T.R.Padmanabhan, Programming with Python,Springer Publications,2016
3. "CS41 - The Python Programming Language", *Stanfordpython.com*, 2019. [Online]. Available: https://stanfordpython.com/#overview. [Accessed: 20- Jun- 2019].
4. "Python for Data Science", *Cognitive Class*, 2019. [Online]. Available: https://cognitiveclass.ai/courses/python-for-data-science/. [Accessed: 20- Jun- 2019].

**COURSE DESIGNERS**

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| | | | | |

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| 35021P14 | DIGITAL MARKETING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-PS | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course will acquaint the learners to create a structured digital marketing plan and budget, Identify the correct measures to set objectives and evaluate digital marketing, Review and prioritize the strategic options for boosting customer acquisition, conversion, and retention using digital marketing.

**PREREQUISITE : Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To give the brief introduction of digital marketing |
| 2. | To discuss the Service engine advertising and display marketing in internet marketing |
| 3. | To overview the creating of concepts and types of Social media marketing |
| 4. | To discuss the details of Search Engine Optimization and Web analytics |
| 5. | To manage the advancement social media and maintaining the online reputation |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand the concepts of digital marketing. | Understand |
| **CO2:** Understand the skills required for digital marketing | Understand |
| **CO3:** Analyze the Digital Marketing Platforms like Facebook, Twitter, Linkedin, and etc., | Analyze |
| **CO4:** Introduction to the basics of Search Engine Optimization (SEO) and Web analytics | Apply |
| **CO5:** Understand and develop the digital marketing capstone | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO 12 | PSO1 | PSO2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | M | M | - | M | M | | | | | | | M | | |
| **CO2** | M | M | S | | M | M | | | | | | | M | M | M |
| **CO3** | S | M | M | M | M | M | | | M | | | | M | | |
| **CO4** | S | M | M | M | M | M | | | M | | | | M | M | M |
| **CO5** | S | M | S | M | M | M | | M | M | | | | M | | |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

UNIT I INTRODUCTION TO DIGITAL MARKETING

What is Digital Marketing - Why Digital Marketing - Digital Marketing Platforms - Organic and Paid Digital Marketing - Difference between Traditional Marketing and digital Marketing - types and channels of digital marketing - tools of digital marketing - Advantage and Disadvantage of Digital Marketing - Skills required in Digital Marketing - Digital Marketing Plan.

**UNIT II INTERNET MARKETING**

Internet Marketing opportunities and challenges - Digital marketing framework - **Search Engine Advertising:** - Pay for Search Advertisements - Ad Placement - Ad Ranks - Creating Ad Campaigns - Campaign Report Generation - **Display marketing:** - Types of Display Ads - Buying Models - Programmable Digital Marketing - Analytical Tools - YouTube marketing

UNIT III SOCIAL MEDIA MARKETING

Introduction to social media platforms, penetration & characteristics - Building a successful social media marketing strategy - Facebook Marketing: - Business through Facebook Marketing, Creating Advertising Campaigns, Adverts, Facebook Marketing Tools - Linkedin Marketing: - Introduction and Importance of Linkedin Marketing, Framing Linkedin Strategy, Lead Generation through Linkedin, Content Strategy, Analytics and Targeting - Twitter Marketing: - Introduction to Twitter Marketing, how twitter Marketing is different than other forms of digital marketing, framing content strategy, Twitter Advertising Campaigns - Instagram and Snapchat: - Digital Marketing Strategies through Instagram and Snapchat - Mobile Marketing: - Mobile Advertising, Forms of Mobile Marketing, Features, Mobile Campaign Development, Mobile Advertising Analytics.

**UNIT IV SEO, WEB ANALYTICS**

Introduction and need for SEO - How to use internet & search engines - search engine and its working pattern - On-page and off-page optimization - SEO Tactics - Planning A New Website - Market Your Optimized Website - Analytics and Measurement. - Introduction to Digital Analytics - Building Blocks - Fundamentals of Digital Analytics - Business Perspective - Data Analysis Fundamentals - Analysis Perspective: Providing Insights - Enabling Capabilities - Managing Analytics - Audience - Acquisition - Behavior - Conversions Onboarding - Retention and Expansion - Advocacy - Privacy and Ethics - Wrapping Up

**UNIT V ADVANCED SOCIAL MEDIA**

Understanding Paid Earned and Owned Social Media - Social Sharing - Blogging for Business - Finding and Communicating with Influencers - Online Reputation Management - Social Media Measurement - Social Media Analytics - Pinterest Marketing - Digital Marketing Capstone.

**TEXT BOOK:**


1. Ryan, D. (2014 ). Understanding Digital Marketing: Marketing Strategies for Engaging the Digital Generation, Kogan Page Limited.


**REFERENCES:**


1. Jan Zimmerman, Deborah Ng - Social Media Marketing All-in-One For Dummies - 4th Edition – John Wiley & Sons Inc.
2. The Beginner's Guide to Digital Marketing (2015). Digital Marketer. Pulizzi,J.(2014) Epic Content Marketing, Mcgraw Hill Education.
3. Dave Chaffey & Fiona Ellis , Digital Marketing: Strategy, Implementation & Practice – 6 th Edition, Pearson.
4. Eric Enge , Art of SEO (3rd edition) - O'Reilly.


**COURSE DESIGNERS**


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| 34121I07 | BUSINESS INTELLIGENCE AND ITS APPLICATIONS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

Business Intelligence (BI) refers to the tools, technologies, applications and practices used to collect, integrate, analyze, and present an organization's raw data in order to create insightful and actionable business information in Data mining.

**PREREQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To Introduce students to various business intelligence concepts |
| 2 | To learn the concepts of data integration used to develop intelligent systems for decision support |
| 3 | To introduce visualization tool for prepare the enterprise reporting |
| 4 | To learn analytical components and technologies used to create dashboards and scorecards, data/text/Web mining methods |
| 4 | To gain new insights into organizational operations in implementation of systems for Business Intelligence (BI) |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Learn about the concepts of OLTP and OLAP for BI infrastructure development | Understand |
| CO2. Gained an understanding of how business professionals can use analytics techniques to formulate and solve relevant problems and how they use analytics to support decision making | Analyze |
| CO3. Apply Clustering, Association and Classification techniques for Data Integration | Apply |
| CO4. Assess BI tools to solve problems, issues, and trends using predictive analysis | Apply |
| CO5. Develop systems to measure, monitor and predict the enterprise variables and performance indicators for business decision-making process | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | M | - | - | - | - | - | - | M | | M | | M |
| CO2 | S | M | L | - | M | - | - | - | - | - | - | M | | M | | M |
| CO3 | S | M | L | - | M | - | - | - | - | - | - | M | | M | | M |
| CO4 | S | M | L | - | M | - | - | - | - | - | - | M | | M | | |
| CO5 | S | M | L | - | M | - | - | - | - | - | - | M | | M | | |

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**SYLLABUS**

**INTRODUCTION TO BUSINESS INTELLLIGENCE**

Introduction to OLTP AND OLAP – BI Definition and BI Concepts – Business Applications of BI - BI Framework- Role of Data Warehousing in BI –BI Infrastructure Components- BI Process – Developing Data Warehouse – Management Framework – Business driven approach –BI Technology — BI Roles & Responsibilities.

**BASICS OF DATA INTEGRATION**

Concepts of Data Integration need and advantages of using Data Integration – Introduction to common data integration approaches – Introduction to ETL using SSIS – Introduction to Data Quality – Data Profiling Concepts and Applications.

**INTRODUCTION TO MULTIDIMENSIONAL DATA MODELING**

Introduction to Data and Dimensional Modeling – Multi Dimensional Data Model – ER modeling Vs Multi Dimensional Model – Concepts of Dimensions - facts - cubes- attributes- hierarchies- star and snowflake schema – Introduction to Business Metrics and KPIs – Creating Cubes using SSAS.

**BASICS OF ENTERPRISE REPORTING**

Introduction to Enterprise Reporting - Concepts of dashboards - balanced scorecards – Introduction to SSRS Architecture– Enterprise Reporting using SSRS reporting service

**BI ROAD AHEAD**

BI and Mobility – BI and cloud computing – BI for ERP systems - Benefits of BI in ERP- NorthWind_Traders Data-Data Analyses through Excel-Kettle Tool – Conversion of data using Kettle Tool.

**TEXT BOOKS**

1.RN Prasad, Seema Acharya, ”Fundamentals Of Business Analytics” Wiley India,2011

**REFERENCES**

1. Soumendra Mohanty, “Data Warehousing Design, Development and Best Practices”, Tata McGraw-Hill, New Delhi, 2007.
2. David Loshin, “Business Intelligence”, Morgan Kaufmann Publishsers, San Francisco, Fifth edition, 2007.
3. Larissa Terpeluk Moss and Shaku Atre, “Business Intelligence Roadmap”, Pearson Education, 2007

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| COURSE DESIGNERS | | | | |
|---|---|---|---|---|
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| 34121I06 | BUILDING ENTERPRISE APPLICATIONS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

Enterprise Applications are complex systems. They require delicate planning and expertise for the right type of development Enterprise Applications are the instruments of administration, management, and planning for an enterprise

**PREREQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To teach the students about various ways to build enterprise applications |
| 2 | At the completion of the class, they should understand how to deploy systems to a number of different host platforms |
| 3 | They develop graphical user interfaces, as well as character-oriented screens. They test and debug their system |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Familiarize with concept of Enterprise Analysis and Business Modeling. | Understand |
| CO2. Understand requirements validation, planning and estimation. Design and document the application architecture. | Understand |
| CO3. Understand the importance of application framework and designing other application components | Apply |
| CO4. Construct and develop different solution layers. | Apply |
| CO5. Perform Code review, Code analysis, build process. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | M | M | - | - | - | M | - | M | - | **S** | M | M |
| CO2 | S | M | M | M | M | - | - | - | M | - | - | - | **S** | M | M |
| CO3 | S | - | M | M | M | - | - | - | M | - | - | M | **S** | - | M |
| CO4 | S | M | S | M | S | - | - | - | S | M | M | M | **S** | M | M |
| CO5 | S | M | S | M | S | - | - | - | S | S | S | M | **S** | M | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**Introduction**

enterprise applications and their types, software engineering methodologies, life cycle of raising an enterprise application, introduction to skills required to build an enterprise application, key determinants of successful enterprise applications, and measuring the success of enterprise application

**Incepting of enterprise applications**

Enterprise analysis, business modeling, requirements elicitation, use case modeling, prototyping, non functional requirements, requirements validation, planning and estimation

**Architecting and Designing enterprise applications**

Concept of architecture, views and viewpoints, enterprise architecture, logical architecture, technical architecture- design, different technical layers, best practices, data architecture and design – relational, XML, and other structured data representations, Infrastructure architecture and design elements - Networking, Internetworking, and Communication Protocols, IT Hardware and Software, Middleware, Policies for Infrastructure Management, Deployment Strategy, Documentation of application architecture and design

**Constructing of enterprise applications**

Construction readiness of enterprise applications - defining a construction plan, defining a package structure, setting up a configuration management plan, setting up a development environment, introduction to the concept of Software Construction Maps, construction of technical solutions layers, methodologies of code review, static code analysis, build and testing, dynamic code analysis – code profiling and code coverage

**Testing and Rolling out enterprise applications**

Types and methods of testing an enterprise application, testing levels and approaches, testing environments, integration testing, performance testing, penetration testing, usability testing, globalization testing and interface testing, user acceptance testing, rolling out an enterprise application.

**TEXT BOOKS**

1. Raising Enterprise Applications – Published by John Wiley, authored by Anubhav Pradhan, Satheesha B. Nanjappa, Senthil K. Nallasamy, Veerakumar Esakimuthu
2. Building Java Enterprise Applications – Published by O'Reilly Media, authored by Brett McLaughlin

**REFERENCE BOOK**

1. Software Requirements: Styles & Techniques – published by Addison-Wesley Professional
2. Software Systems Requirements Engineering: In Practice – published by McGraw-Hill/Osborne Media
3. Managing Software Requirements: A Use Case Approach, 2/e – published by Pearson
4. Software Architecture: A Case Based Approach – published by Pearson

**COURSE DESIGNERS**

**INFOSYS**

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| 34121I15 | INTERNET AND WEB TECHNOLOGY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course is intended to teach the basics involved in publishing content on the World Wide Web. This includes the 'language of the Web' – HTML, the fundamentals of how the Internet and the Web function, a basic understanding of graphic production with a specific stress on creating graphics for the Web, and a general grounding introduction to more advanced topics such as programming and scripting.

**PREREQUISITE –Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To introduce basic concepts of internet |
| 2 | To learn about HTML & XML |
| 3 | To learn about internet security |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1 . Analyze a web page and identify its elements and attributes. | Analyze |
| CO2. Create web pages using XHTML and Cascading Style Sheets. | Apply |
| CO3. Build dynamic web pages using JavaScript (Client side programming). | Apply |
| CO4. Create XML documents and Schemas | Apply |
| CO5. Build interactive web applications using JSP | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | M | - | - | - | M | - | - | M | **S** | M | M |
| CO2 | S | M | L | - | M | - | - | - | M | - | - | - | **S** | M | M |
| CO3 | S | M | L | - | L | - | - | - | M | - | - | L | **S** | M | M |
| CO4 | S | M | L | - | M | - | - | - | M | - | - | - | **S** | M | M |
| CO5 | S | M | L | - | M | - | - | - | M | - | - | L | **S** | M | M |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**INTRODUCTION TO INTERNET**

Introduction, Evolution of Internet, Internet Applications, Internet Protocol -TCP/IP, UDP, HTTP, Secure Http(Shttp) Internet Addressing – Addressing Scheme – Ipv4 & IPv6, Network Byte Order, Domain Name Server and IP Addresses, Mapping . Internet Service Providers, Types Of Connectivity Such As Dial-Up Leaded Vsat Etc. Web

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Technologies: Three Tier Web Based Architecture; Jsp, Asp, J2ee, .Net Systems

**HTML CSS AND SCRIPTING**

HTML – Introduction, Sgml, Dtd(Document Type Definition, Basic Html Elements, Tags and usages, HTML Standards , Issues in HTML Dhtml: Introduction Cascading Style Sheets: Syntax ,Class Selector, Id Selector Dom (Document Object Model) & Dso (Data Source Object) Approaches To Dynamic Pages: Cgi, Java Applets, Plug Ins, Active X, Java Script – Java Script Object Model, Variables-Constant – Expressions, Conditions- Relational Operators- Data Types – Flow Control – Functions & Objects-events and event handlers – Data type Conversion & Equality – Accessing HTML form elements

**XML**

What is XML – Basic Standards, Schema Standards, Linking & Presentation Standards, Standards that build on XML, Generating XML data, Writing a simple XML File, Creating a Document type definition, Documents & Data ,Defining Attributes & Entities in the DTD ,Defining Parameter Entities & conditional Sections, Resolving a naming conflict, Using Namespaces, Designing an XML data structure, Normalizing Data, Normalizing DTDS

**INTERNET SECURITY & FIREWALLS**

Security Threats From Mobile Codes, Types Of Viruses, Client Server Security Threats, Data & Message Security, Various electronic payment systems, Introduction to EDI,Challenges–Response System, Encrypted Documents And Emails , Firewalls: Hardened Firewall Hosts, Ip- Packet Screening, Proxy Application Gateways, Aaa (Authentication ,Authorization And Accounting).

**WEBSITE PLANNING & HOSTING**

Introduction, Web Page Lay-Outing, Where To Host Site, Maintenance Of Site, Registration Of Site On Search Engines And Indexes, Introduction To File Transfer Protocol, Public Domain Software, Types Of Ftp Servers (Including Anonymous),FtpClients Common Command. Telnet Protocol, Server Domain, Telnet Client, Terminal Emulation. Usenet And Internet Relay Chat.

**TEXT BOOKS**

1. Internet & Intranet Engineering,- Daniel Minoli, TMH.

2 .Alexis Leon and Mathews Leon – Internet for Every One, Tech World.

**REFERENCES**

1. Eric Ladd, Jim O'Donnel –"Using HTML 4, XML and JAVA"-Prentice Hall of India -1999.

2. "Beginning Java Script "– Paul Wilton – SPD Publications –2001

**Course Designers:**

**INFOSYS**

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| 35021I01 | LEARNING IT ESSENTIALS BY DOING | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

The proposed elective course exposes the non-CS/IT students to IT Essentials. The core modules of this Elective includes programming , Database and web Technology amongst other related topics. This course refers to the basic tools and technologies for the right type of website development and enable student to create simple web applications

**PREREQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn about the essentials of Information Technology |
| 2 | To get an idea about the scripting languages. |
| 3 | To get an idea about the internet protocols |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1 Understand the networking concept internet protocols, network routing | Understand |
| CO2. Understand the fundamentals of web applications and its modeling | Understand |
| CO3. Understand and learn the scripting languages with design of web applications | Understand |
| CO4. Analyze the process of mobile communication and network technologies | Analyze |
| CO5. Build simple interactive applications, database applications and multimedia applications. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | M | - | - | - | - | - | - | - | M | **S** | M | M |
| CO2 | S | M | M | M | - | - | - | - | - | - | - | M | **S** | - | M |
| CO3 | S | M | M | M | - | - | - | - | - | - | - | M | **S** | M | M |
| CO4 | M | M | M | M | M | - | - | - | - | - | - | M | **S** | M | - |
| CO5 | M | M | M | M | S | - | - | - | - | - | - | M | - | M | M |

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**SYLLABUS**

**Fundamentals of Computer architecture**

introduction-organization of a small computer -Central Processing Unit - Execution cycle – Instruction categories – measure of CPU performance Memory – Input/output devices - BUS-addressing modes. System Software – Assemblers – Loaders and linkers – Compilers and interpreters

**Operating system**

Introduction – memory management schemes Process management Scheduling – threads. Problem solving with algorithms- Programming styles – Coding Standards and Best practices - Introduction to C -Programming Testing and Debugging. Code reviews -System Development Methodologies – Software development Models -User interface Design – introduction – The process – Elements of UI design & reports.

**RDBMS**

Data processing – the database technology – data models-ER modeling concept –notations – Extended ER features -Logical database design - normalization -SQL – DDL statements – DML statements – DCL statements

Writing Simple queries – SQL Tuning techniques – Embedded SQL - OLTP

**Objected oriented concepts**

Object oriented programming -UML Class Diagrams– relationship – Inheritance – Abstract classes – polymorphism-Object Oriented Design methodology - Common Base class -Alice Tool – Application of OOC using Alice tool.

**Client server computing**

Internet working – Computer Networks – Working with TCP/IP – IP address – Sub netting – DNS – VPN – proxy servers World Wide Web – Components of web application - browsers and Web Servers

URL – HTML – HTTP protocol – Web Applications - Application servers – Web Security.

**REFERENCES**


1. Andrew S. Tanenbaum, Structured Computer Organization, PHI, 3rd ed., 1991
2. Silberschatz and Galvin, Operating System Concepts, 4th ed., Addision-Wesley, 1995
3. Dromey R.G., How to solve it by Computers, PHI, 1994
4. Kernighan, Ritchie, ANSI C language PHI,1992
5. Wilbert O. Galitz, Essential Guide to User Interface Design, John Wiley, 1997
6. Alex Berson, Client server Architecture, Mc Grew Hill International, 1994
7. Rojer Pressman, Software Engineering-A Practitioners approach, McGraw Hill, 5th ed., 2001
8. Alfred V Aho, John E Hopcroft, Jeffrey D Ullman, Design and Analysis of Computer Algorithms, Addison Wesley Publishing Co., 1998
9. Henry F Korth, Abraham Silberschatz, Database System Concept, 2nd ed. McGraw-Hill International editions, 1991
10. Brad J Cox, Andrew J.Novobilski, Object – Oriented Programming – An evolutionary approach, Addison – Wesley, 1991


**Course Designers:**


| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1. | Dr.K.Sasikala | Associate Professor | CSE | sasikalak@vmkvec.edu.in |
| 2. | Mr. K.Karthik | Assistant Professor | CSE | karthik@avit.ac.in |


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| 34121I13 | ESSENTIALS OF INFORMATION TECHNOLOGY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

This course aims to provide the fundamental concepts of Computer operations like hardware and software installation, and emphasizing principles application packages. This course aims at facilitating the student to understand the various concepts and functionalities of Database Management Systems, the method and model to store data and how to manipulate them through query languages, the effective designing of relational database and how the system manages the concurrent usage of data in multi user environment..

**PREREQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To provide basic knowledge of hardware and software components of computers. |
| 2 | To study Problem solving Techniques and program development cycle. |
| 3 | Design and test simple programs in C language |
| 4 | Document artifacts using common quality standards |
| 5 | Design simple data store using RDBMS concepts and implement |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1 Basic knowledge on hardware and software terminologies. | Understand |
| CO2. Apply the knowledge of mathematics, science and computing in the core information technologies | Apply |
| CO3. Understand Program Development Cycle and apply various Problem Solving Techniques | Apply |
| CO4. Develop the function programs with all the concepts in c | Analyze |
| CO5. Build and manipulate relational database using Structured Query Language and relational languages | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | M | M | M | - | - | - | - | - | - | - | **S** | M | M |
| CO2 | S | M | M | M | M | - | - | - | - | - | - | - | **S** | M | M |
| CO3 | S | M | M | M | M | - | - | - | - | - | - | - | **S** | M | M |
| CO4 | S | M | M | M | M | - | - | - | - | - | - | - | **S** | M | M |
| CO5 | S | M | M | M | M | - | - | - | - | - | - | - | **S** | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**Introduction**

Basics of computer systems - Various hardware components - Data storage and various Memory units - Central Processing Unit - Execution cycle - Introduce to software and its classifications. Operating system concepts– Introduction – Memory management - Process management - Intercrosses Communication – Deadlocks - File management -Device management.

**Problem Solving Techniques**

Introduction to problem solving - Computational problem and it's classification - Logic and its types - Introduction to algorithms - Implementation of algorithms using flowchart - Flowcharts implementation through RAPTOR tool - Searching and sorting algorithms - Introduction and classification to Data Structures - Basic Data Structures - Advanced Data Structures

**Programming Basics**

Introduction to Programming Paradigms and Pseudo Code - Basic programming concepts - Program Life Cycle - Control Structures - Introduction and Demonstration of 1-D Array and 2-D Array - Searching and Sorting techniques - Demonstration Concept of memory references in arrays –Strings - Compiler Concepts - Code Optimization techniques. Structured Programming – Functions – Structures - File Handling - Introduction to Software Development Life Cycle - Industry Coding Standards and Best Practices - Testing and Debugging - Code Review

**Project Preparation**

Project Specification - Preparation of High level design and Detailed design document, Unit Test Plan and Integrated Test Plan - Coding and Unit Testing activities - Integration Testing.

**RDBMS**

Data processing – the database technology – data models-ER modeling concept –notations – Extended ER features-Logical database design - normalization -SQL – DDL statements – DML statements – DCL statements -Joins - Sub queries – Views-Database design Issues.

**TEXT BOOKS**


1. Information Technology Planning, Blokdyk Gerardus , Pearson 3rd Edition .


**REFERENCES**


1. "Computer Organization and Architecture" – William Stallings , Pearson 8th Edition
2. "Database System Concepts"- Abraham Silberschatz , Hendry F Korth – Indian 6th Edition.
3. "Computing Fundamentals and C Programming" Paperback – 1 Jul 2017 by E Balagurusamy (Author)
4. "How to solve it by computer " – R G Dromey, Pearson Edition 2006.
5. " Software testing "Principle and Practices - Desikan Srinivasan , Gopalaswamy Ramesh, Pearson Edition 2005.


**Course Designers:**

**INFOSYS**

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| 34121I16 | INTRODUCTION TO MAIN FRAMES | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

The mainframe hardware and z/OS operating system grew up together and are highly complementary for reliability, availability, serviceability, scalability, security, and performance. The operating system taught in this course is z/OS, a widely used mainframe operating system. z/OS is known for its ability to serve thousands of users concurrently and for processing very large workloads in a secure, reliable, and expedient manner..

**PREREQUISITE – Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To get an idea about the mainframe hardware |
| 2 | To get an idea about z/OS |
| 3 | To learn about JCL |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1 Learn the Concept of Computer Architecture ,Mainframes OS and Terminology | Understand |
| CO2. Learn the Concept of virtual storage and its use in z/OS.. | Understand |
| CO3 Understand Job Control language- Various statements in JCL- JCL procedures | Understand and Apply |
| CO4. Build and manipulate relational database using Structured Query Language and relational languages | Apply |
| CO5. Analyze various forms of data representation and structures supported by the COBOL language | Apply and Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | M | M | - | - | - | - | - | - | - | - | **S** | M | M |
| **CO2** | S | M | M | M | - | - | - | - | - | - | - | - | **S** | - | M |
| **CO3** | S | L | M | M | - | - | - | - | - | - | - | - | **S** | M | - |
| **CO4** | S | M | M | M | - | - | - | - | - | - | - | - | **S** | M | M |
| **CO5** | S | M | M | M | - | - | - | - | - | - | - | - | **S** | M | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**UNIT –I EVOLUTION OF MAINFRAME HARDWARE**

Overview of Computer Architecture - Classification of Computers - micro, mini, mainframes and super computer – Mainframe computer - key features - benefits - Evolution of Mainframes - Different hardware systems. Mainframes OS and Terminology: Operating systems on mainframes, Batch processing vs. online processing - mainframe operating system. - evolution - concepts of Address space, Buffer management - Virtual storage - paging - swapping – Dataset management in mainframes.

**UNIT-II Z/OS AND ITS FEATURES**

Z-operating system (Z/OS) - Virtual storage - Paging process - storage Managers - Program execution modes - Address space - Multiple virtual system(MVS) , MVS address space, Z/OS address space - Dataset - sequential and partial dataset - Direct access storage device(DASD) -Access methods - Record formats - Introduction to virtual storage access methods(VSAM) - Catalog – VTOC.

**UNIT-III INTRODUCTION TO JCL**

Introduction to Job Control language - Job processing – structure of JCL statements - Various statements in JCL - JOB statement - EXEC statement – DD statement - JCL procedures and IBM utility programs.

**UNIT-IV COBOL PROGRAMMING**

Introduction – History, evolution and Features, COBOL program Structure, steps in executing COBOL. Language Fundamentals – Divisions, sections, paragraphs, sections, sentences and statements, character set, literals, words, figurative constants, rules for forming user defined words, COBOL coding sheet.. Data division – Data names, level numbers, PIC and VALUE clause, REDEIFNES, RENAMES and USAGE clause. Procedure Division – Input / Output verbs, INITIALIZE verb, data movement verbs, arithmetic verbs, sequence control verbs.

**UNIT-V OVERVIEW OF DB2**

Introduction to DB2 – System Service component, Database Service component, Locking Service component, Distributed Data Facility Services component, Stored Procedure component, catalogs and optimizer. DB2 Objects and Data Types - DB2 Objects Hierarchy, Storage groups, Database, Table space, Table, Index, Clustered index, Synonyms and aliases, Views, Data Types. DB2 SQL programming – Types of SQL statements, DCL, DDL, DML, SPUFI utility. Embedded SQL programming – Host variable, DECLGEN utility, SQLCA, single/multiple row manipulation, cursors, and scrollable cursors.

**TEXT BOOKS**


1. Gabrielle Wiorkowski & David Kull, DB2 Design & Development Guide, Addison Wesley, 1992.
2. Gary DeWard Brown, JCL Programming Bible (with z/OS) fifth edition, Wiley India Dream Tech, 2002.
3. M.K. Roy and D. Ghosh Dastidar, “Cobol Programming”, Tata McGraw Hill, New York, 1973.


**REFERENCES**


1. MVS JCL, Doug Lowe, Mike Murach and Associates.
2. AS/400 Architecture and Application – The Database Machine by Jill T. Lawrence (SPD Publications)


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3. Gary DeWard Brown, JCL Programming Bible (with z/OS) fifth edition, Wiley India Dream Tech, 2002.

4.z/OS V1R4.0 MVS JCL Reference found online at

http://www-.ibm.com/support/docview.wss?uid=pub1sa22759706

5.z/OS V1R1.0 MVS JCL Reference found online at

http://publibz.boulder.ibm.com/cgibin/bookmgr_OS390/BOOKS/iea2b600/CCONTENTS

6. COBOL - Language Reference, Ver 3, Release 2, IBM Redbook.

7. COBOL - Programming Guide, Ver 3, Release 2, IBM Redbook.

8. Complete CL The Definitive Control Language Programming Guide by Ted Holt and Ernie Malaga (SPD Publication).

9. Nancy Stern & Robert A Stern, "Structured Cobol Programming", John Wiley & Sons, New York, 1973.

10. M.K. Roy and D. Ghosh Dastidar, "Cobol Programming", Tata McGraw Hill, New York, 1973.

11. Newcomer and Lawrence, Programming with Structured COBOL, McGraw Hill Books, New York, 1973.

12. Craig S Mullins, DB2 Developer's Guide, Sams Publishing, 1992.

13. Gabrielle Wiorkowski & David Kull, DB2 Design & Development Guide, Addison Wesley, 1992.

14. C J Date & Colin J White, A Guide to DB2, Addison Wesley.

**Course Designers:**

**INFOSYS**

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| 34121I20 | MOBILE APPLICATION DEVELOPMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

In this modern era almost every hands has a handheld devices. Each handheld device have the computing capability to meet the half the needs of user such as banking, browsing, education and emergency etc. It is a must for a computer engineer to have some basic knowledge about the handheld devices platform and its supporting software development. This course will give adequate knowledge in developing a mobile applications for different such as Android, iOS, Windows.

**PRE REQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | Understand system requirements for mobile applications |
| **2.** | Generate suitable design using specific mobile development frameworks |
| **3.** | Generate mobile application design |
| **4.** | Implement the design using specific mobile development frameworks |
| **5.** | Deploy the mobile applications in marketplace for distribution |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1**. Expose to technology and business trends impacting mobile applications | Understand |
| **CO2**.Understand enterprise scale requirements of mobile applications | Understand |
| **CO3.** Familiarize in the Graphics used for Android application development | Apply |
| **CO4.** Competent with the characterization and architecture of mobile applications | Apply |
| **CO5.** Competent with designing and developing mobile applications using one application development framework. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | S | M | M | M | M | - | - | M | - | - | - | M | **S** | M | M |
| **CO2** | S | M | M | M | M | - | - | M | - | - | - | M | **S** | M | M |
| **CO3** | S | M | L | M | L | - | - | M | - | - | - | L | **S** | M | M |
| **CO4** | S | M | M | M | M | - | - | M | - | - | - | M | **S** | M | M |
| **CO5** | S | M | M | M | L | - | - | M | - | - | - | L | **S** | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**UNIT I INTRODUCTION**

Introduction to mobile applications –Embedded systems -Market and business drivers for mobile applications –Publishing and delivery of mobile applications –Requirements gathering and validation for mobile applications

**UNIT II BASIC DESIGN**

Introduction –Basics of embedded systems design –Embedded OS -Design constraints for mobile applications, both hardware and software related –Architecting mobile applications –User interfaces for mobile applications –touch events and gestures –Achieving quality constraints –performance, usability, security, availability and modifiability.

**UNIT III ADVANCED DESIGN**

Designing applications with multimedia and web access capabilities – Integration with GPS and social media networking applications – Accessing applications hosted in a cloud computing environment – Design patterns for mobile applications.

**UNIT IV TECHNOLOGY I – ANDROID**

Introduction – Establishing the development environment – Android architecture – Activities and views – Interacting with UI –Persisting data using SQLite–Packaging and deployment –Interaction with server side applications –Using Google Maps, GPS and Wifi –Integration with social media applications.

**UNIT V TECHNOLOGY II –IOS**

Introduction to Objective C –iOS features –UI implementation –Touch frameworks –Data persistence using Core Data and SQLite –Location aware applications using Core Location and Map Kit –Integrating calendar and address book with social media application –Using Wifi -iPhone marketplace.

**TEXT BOOKS**

1. Jeff McWherter and Scott Gowell, "Professional Mobile Application Development", Wrox, 2012.

**REFERENCES**

1. Charlie Collins, Michael Galpin and Matthias Kappler, “Android in Practice”, DreamTech, 2012.

2. James Dovey and Ash Furrow, “Beginning Objective C”, Apress, 2012.

3. David Mark, Jack Nutting, Jeff LaMarche and Frederic Olsson, “Beginning iOS 6 Development: Exploring the iOS SDK”, Apress, 2013

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| 34121I10 | CYBER FORENSICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE:**

To learn computer forensics and • To become familiar with forensics tools and learn to analyze and validate forensics data

**PREREQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To learn computer forensics |
| 2 | To become familiar with forensics tools |
| 3 | To learn to analyze and validate forensics data |
| 4 | To learn Identify the vulnerabilities in a given network infrastructure |
| 5 | To Implement real-world hacking techniques to test system security |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Understand the basics of computer forensics | Understand |
| CO2. Apply a number of different computer forensic tools to a given scenario | Apply |
| CO3. Analyze and validate forensics data. | Apply |
| CO4:. Identify the vulnerabilities in a given network infrastructure | Apply |
| CO5: Implement real-world hacking techniques to test system security | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | L | L | - | - | - | - | - | L | - | L | S | L | L |
| CO2 | S | S | M | - | - | M | M | L | - | L | - | - | S | L | L |
| CO3 | S | S | M | L | - | M | M | L | - | - | L | - | S | L | - |
| CO4 | S | S | M | L | L | L | M | M | M | M | L | L | S | S | - |
| CO5 | S | S | M | M | M | L | M | M | L | M | M | M | S | S | L |
| CO6 | S | S | L | - | - | L | M | L | - | - | - | L | S | L | - |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**UNIT I INTRODUCTION TO COMPUTER FORENSICS**

Introduction to Traditional Computer Crime, Traditional problems associated with Computer Crime. Introduction to Identity Theft & Identity Fraud. Types of CF techniques - Incident and incident response methodology - Forensic duplication and investigation. Preparation for IR: Creating response tool kit and IR team. - Forensics Technology and Systems - Understanding Computer Investigation – Data Acquisition.

**UNIT II EVIDENCE COLLECTION AND FORENSICS TOOLS**

Processing Crime and Incident Scenes – Working with Windows and DOS Systems. Current Computer Forensics Tools: Software/ Hardware Tools.

**UNIT III ANALYSIS AND VALIDATION**

Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics – Email Investigations – Cell Phone and Mobile Devices Forensics

**UNIT-IV ETHICAL HACKING**

Introduction to Ethical Hacking - Footprinting and Reconnaissance - Scanning Networks - Enumeration - System Hacking - Malware Threats - Sniffing

**UNIT V ETHICAL HACKING IN WEB**

Social Engineering - Denial of Service - Session Hijacking - Hacking Web servers - Hacking Web Applications – SQL Injection - Hacking Wireless Networks - Hacking Mobile Platforms.

**TEXT BOOKS:**

1. Bill Nelson, Amelia Phillips, Frank Enfinger, Christopher Steuart, ―Computer Forensics and Investigations‖, Cengage Learning, India Edition, 2016.
2. CEH official Certfied Ethical Hacking Review Guide, Wiley India Edition, 2015.

**REFERENCES**

1. John R.Vacca, ―Computer Forensics‖, Cengage Learning, 2005
2. MarjieT.Britz, ―Computer Forensics and Cyber Crime‖: An Introduction‖, 3rd Edition, Prentice Hall, 2013.
3. AnkitFadia ― Ethical Hacking‖ Second Edition, Macmillan India Ltd, 2006
4. Kenneth C.Brancik ―Insider Computer Fraud‖ Auerbach Publications Taylor & Francis Group–2008.

**COURSE DESIGNERS**

**AVANZO**

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| 34121I09 | CRYPTOGRAPHY AND NETWORK SECURITY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE:**
To understand Cryptography Theories, Algorithms and Systems. and necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks

**PREREQUISITE: Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand Cryptography Theories, Algorithms and Systems. |
| 2 | To understand necessary Approaches and Techniques to build protection mechanisms in order to secure computer networks |
| 3 | To Understand different cryptographic operations of symmetric cryptographic algorithms. |
| 4 | To Understand various Authentication schemes to simulate different applications |
| 5 | To Understand various Security practices and System security standards. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Understand the fundamentals of networks security, security architecture, threats and vulnerabilities | Understand |
| CO2. Apply the different cryptographic operations of symmetric cryptographic algorithms. | Apply |
| CO3. Apply the different cryptographic operations of public key cryptography. | Apply |
| CO4:. Apply the various Authentication schemes to simulate different applications. | Apply |
| CO5: Understand various Security practices and System security standards. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | L | L | - | - | - | - | - | L | - | L | S | L | L |
| CO2 | S | S | M | - | - | M | M | L | - | L | - | - | S | L | L |
| CO3 | S | S | M | L | - | M | M | L | - | - | L | - | S | L | - |
| CO4 | S | S | M | L | L | L | M | M | M | M | L | L | S | S | - |
| CO5 | S | S | M | M | M | L | M | M | L | M | M | M | S | S | L |
| CO6 | S | S | L | - | - | L | M | L | - | - | - | L | S | L | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**UNIT 1 INTRODUCTION**

Security trends - Legal, Ethical and Professional Aspects of Security, Need for Security at Multiple levels, Security Policies - Model of network security – Security attacks, services and mechanisms – OSI security architecture – Classical encryption techniques: substitution techniques, transposition techniques, steganography.- Foundations of modern cryptography: perfect security – information theory – product cryptosystem – cryptanalysis.

**UNITII - SYMMETRIC CRYPTOGRAPHY**

MATHEMATICS OF SYMMETRIC KEY CRYPTOGRAPHY: Algebraic structures - Modular arithmetic-Euclid's algorithm- Congruence and matrices - Groups, Rings, Fields- Finite fields- SYMMETRIC KEY CIPHERS: SDES – Block cipher Principles of DES – Strength of DES – Differential and linear cryptanalysis - Block cipher design principles – Block cipher mode of operation – Evaluation criteria for AES – Advanced Encryption Standard - RC4 – Key distribution.

**UNITIII - PUBLIC KEY CRYPTOGRAPHY**

MATHEMATICS OF ASYMMETRIC KEY CRYPTOGRAPHY: Primes – Primality Testing – Factorization – Euler's totient function, Fermat's and Euler's Theorem - Chinese Remainder Theorem – Exponentiation and logarithm - ASYMMETRIC KEY CIPHERS: RSA cryptosystem – Key distribution – Key management – Diffie Hellman key exchange - ElGamal cryptosystem – Elliptic curve arithmetic-Elliptic curve cryptography.

**UNIT IV - MESSAGE AUTHENTICATION AND INTEGRITY**

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC – SHA –Digital signature and authentication protocols – DSS- Entity Authentication: Biometrics, Passwords, Challenge Response protocols- Authentication applications - Kerberos, X.509

**UNIT V SECURITY PRACTICE AND SYSTEM SECURITY**

Electronic Mail security – PGP, S/MIME – IP security – Web Security - SYSTEM SECURITY: Intruders – Malicious software – viruses – Firewalls.

**TEXT BOOKS:**

1. William Stallings, Cryptography and Network Security: Principles and Practice, PHI 3rd Edition, 2006.

**REFERENCES:**

1. C K Shyamala, N Harini and Dr. T R Padmanabhan: Cryptography and Network Security, Wiley India Pvt.Ltd

2. BehrouzA.Foruzan, Cryptography and Network Security, Tata McGraw Hill 2007.

3. Charlie Kaufman, Radia Perlman, and Mike Speciner, Network Security: PRIVATE Communication in a PUBLIC World, Prentice Hall, ISBN 0-13-046019-2

**COURSE DESIGNERS**

**INFOSYS**

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| 34121I08 | CLOUD DATABASE MANAGEMENT AND SECURITY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | EC-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

This syllabus is intended for the Engineering students and enables them to lean about Cloud Database Management and Security. This syllabus contains introduction about the cloud computing, sales force architectures, sales force UI and building blocks. Thus, this syllabus focuses on to know about Cloud Database Management and Security.

**PREREQUISITE :NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1. | To understand cloud computing security concepts |
| 2. | To study various cloud services |
| 3. | To apply cloud computing in collaboration with other services |
| 4. | To understand the cloud Database management |
| 5. | To apply cloud computing online |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1:** Understand basic service concepts of cloud computing | Understand |
| **CO2:** Understand and apply sales force architecture | Understand |
| **CO3:** Apply virtualization techniques | Apply |
| **CO4:** apply the attacks concepts in Salesforce Building Blocks | Apply |
| **CO5:** Understand and apply legal issues in cloud services | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | | M | | M | - | - | - | - | - | - | | S | M | - |
| CO2 | | M | L | | L | - | - | - | - | - | M | M | S | | M |
| CO3 | | | S | M | | - | - | - | - | - | - | | | - | |
| CO4 | S | | | M | | - | - | - | - | - | - | M | S | M | M |
| CO5 | | M | | | M | - | - | - | - | - | - | M | S | | - |

S- Strong; M-Medium; L-Low

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**Course Curriculum**
**Cloud Database Management and Security**

**Unit 1:** **(9)**

Introduction to Cloud computing – CRM – Problems faced by the IT industry – Introduction to SaaS – PaaS -IaaS - What is Salesforce.

**Practical**: Introduction to JAVA programming.

**Unit 2:** **(9)**

Salesforce Architecture – Conventional Database tables and objects – Standard and Custom objects – Objects and Fields – Datatypes – Aggregating and Validating Data - Relational Data Modelling

**Practical**: Learning and Building of Schemas

**Unit 3:** **(9)**

What is UI – Introduction to sales force UI - Customizing the sales force UI – Salesforce terminology – Page layouts – App builder – Automating Business Process – Workflow rule – Process builder – Email Templates – Salesforce Application elements

**Practical**: Salesforce Building Blocks

**Unit 4:** **(9)**

Data Security – Profiles and Roles – Audit and Troubleshooting: Audit logs – Debug logs –Email logs.

**Practical:** Creating users, Profiles, Roles and Groups.

**Unit 5:** **(9)**

Database management – Reports and Dashboard management - Data loader – Uploading Relational Data – Standard and Custom Report types – Scheduling Report and Dashboards.

**Practical (sample):**

- Create an app for Event Management that takes care of – Event Registrations, Confirmations, Cancellations, Speaker associations, and other event-related activities.
- Ticket booking system.

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| 34121O03 | FINANCE AND ACCOUNTING FOR ENGINEERS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-IE | 3 | 0 | 0 | 3 |

**PREAMBLE:** Engineers are in a position to do Decision Making during every activity in the industry. The activities ranging from Operation to Non-Operation during the routine functions of the organization. Especially, Finance and Accounting also becomes the part of responsibility of every engineer to do data analysis activities. His interpretation through data analysis and reporting in every transaction helps the organization to do decision making to run the organization effectively and efficiently. Finance and Accounting Practices enable the engineers to handle the resources to do cost and Financial decisions with optimum resources for the betterment of the organization.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES:**

1. To understand the concepts and conventions to prepare Income Statement, and Balance Sheet.
2. To apply the various methods to claim depreciation and
3. To practice fundamental investment decision through capital budgeting techniques.
4. To analyse cost-volume profit analysis for decision making and analyse standard costing techniques.
5. To estimate the working capital requirements for day-to-day activities and handling inventories with economic ordering quantities.

**COURSE OUTCOMES:**

After successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Understand the importance of recording, book keeping and reporting of the business transaction. | Understand |
| CO2: Identify and Apply suitable method for charging depreciation on fixed assets. | Apply |
| CO3: Analyse the various methods of capital budgeting techniques for investment decision. | Apply |
| CO4: Justify the scope of cost-volume-profit analysis, standard costing, and marginal costing techniques for decision making. | Analyse |
| CO5: Estimation of working capital requirements of the organization. | Evaluate |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| Cos | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | - | - | M | L | S | M | - | S | - | M | M | L | M | L | M |
| CO2 | L | - | - | L | M | - | L | L | - | - | L | M | L | L | - |
| CO3 | - | M | - | M | L | - | - | L | S | M | - | L | - | L | M |
| CO4 | L | L | - | S | - | - | L | - | - | L | M | L | M | L | M |
| CO5 | L | - | L | S | L | - | - | M | M | L | - | L | M | M | - |

**S- Strong; M-Medium; L-Low**

**SYLLABUS:**

**Introduction:** Business Environment – Book Keeping and Accounting – Accounting Concepts and Conventions – Double entry system – Preparation of journal, ledger and Trial balance – Final Accounts.

**Deprecation:** Meaning – Causes - Methods of Calculating Depreciation: Straight Line Method, Diminishing Balance Method and Annuity Method.

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**Capital Budgeting Decisions:** Meaning – Nature & Importance of Investment Decisions – Types - Financial statement analysis and interpretation - Types of Analysis - Objectives - Tools of Analysis - Ratio Analysis: Objectives, Uses and Limitations - Classification of Ratios: Liquidity, Profitability, Financial and Turnover Ratios - Funds Flow Analysis and Cash Flow Analysis: Sources and Uses of Funds, Preparation of Funds Flow statement, Uses and Limitations: Pay Back Period – Accounting Rate of Return – NPV – IRR - Profitability Index.

**Marginal Costing:** Marginal Cost - Breakeven Analysis - Cost Volume Profit Relationship - Applications of Standard and marginal Costing Techniques.

**Working Capital Management:** – Types of Working Capital – Operating Cycle – Determinants of Working Capital - Receivables Management – Inventory Management – Need for holding inventories – Objectives – Inventory Management Techniques: EOQ & Reorder point – ABC Analysis - Cash Management – Motives for holding cash.

**Text Book**


1. Kesavan, C. Elenchezhian, and T. Sunder Selwyan, "Engineering Economics and Financial Accounting", Firewall Media, 2005.
2. Kasi Reddy .M and Saraswathi .S, "Managerial Economics and Financial Accounting", PHI Learning Pvt., Ltd. 2007.


**Reference Book**


1. Periyasamy .P, "A Textbook of Financial, Cost and Management Accounting", Himalaya Publishing House, 2010.
2. Palanivelu V.R., "Accounting for Managers", Lakshmi Publications, 2005.
1. Mark S Bettner, Susan Haka, Jan Williams, Joseph V Carcello, "Financial and Management Accounting", Mc-Graw-Hill Education, 2017


**COURSE DESIGNERS:**


| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
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| 2. | Dr. Rajeshkumar | Assistant Professor | Management Studies | rajesh.mba@avit.ac.in |


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analysis and interpretation - Types of Analysis - Objectives - Tools of Analysis - Ratio Analysis: Objectives, Uses and

Limitations - Classification of Ratios: Liquidity, Profitability, Financial and Turnover Ratios - Funds Flow Analysis andCash Flow Analysis: Sources and Uses of Funds, Preparation of Funds Flow statement, Uses and Limitations: Pay Back Period – Accounting Rate of Return – NPV – IRR - Profitability Index.

**Marginal Costing:** Marginal Cost - Breakeven Analysis - Cost Volume Profit Relationship - Applications of Standardand marginal Costing Techniques.

**Working Capital Management:** – Types of Working Capital – Operating Cycle – Determinants of Working Capital -Receivables Management – Inventory Management – Need for holding inventories – Objectives – Inventory Management Techniques: EOQ & Reorder point – ABC Analysis - Cash Management – Motives for holding cash.

**Text Book**


1. Kesavan, C. Elenchezhian, and T. Sunder Selwyan, "Engineering Economics and Financial Accounting",Firewall Media, 2005.
2. Kasi Reddy .M and Saraswathi .S, "Managerial Economics and Financial Accounting", PHI Learning Pvt., Ltd.2007.


**Reference Book**


1. Periyasamy .P, "A Textbook of Financial, Cost and Management Accounting", Himalaya Publishing House,2010.
2. Palanivelu V.R., "Accounting for Managers", Lakshmi Publications, 2005.
1. Mark S Bettner, Susan Haka, Jan Williams, Joseph V Carcello, "Financial and Management Accounting", Mc-Graw-Hill Education, 2017


**COURSE DESIGNERS:**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1. | M.Manickam | Associate Professor | Management Studies | manickam@vmkec.edu.in |
| 2. | Dr. Rajeshkumar | Assistant Professor | Management Studies | rajesh.mba@avit.ac.in |

Dr. M. NITHYA,
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| 34121O04 | INNOVATION, PRODUCT DEVELOPMENT AND COMMERCIALIZATION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

commercialization of innovation and new products in fast-paced, high-tech markets and matching technological innovation to market opportunities.

**PREREQUISITE -** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To make students understand multiple-perspective approach in organization to capture knowledge and creativity to develop successful products and services for Volatile, Uncertain, Complex and Ambiguous (VUCA) world. |
| 2 | Inculcate a disruptive thought process to generate ideas for concurrent and futuristic problems of society in general and markets in particular which focus on commercialization |
| 3 | Improved understanding of organizational best practices to transform exciting technology into successful products and services |
| 4 | Critically assess and evaluate innovation policies and practices in organizations especially from a cultural and leadership point of view |
| 5 | Explain why innovation isessential to organizational strategy – especially in a global environment |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Understand the role of innovation in gaining and maintaining competitive advantage | Understand |
| CO2: Integrate the innovation basis and its role in decision making especially under uncertainty | Apply |
| CO3: Analyze business challenges involving innovation management | Apply |
| CO4: Having problem solving ability – solving social issues and business problems | Apply |
| CO5: Comprehend the different sources of innovation | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | P012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | - | - | - | M | S | S | - | M | - | - |
| CO2 | S | S | S | M | M | M | - | - | - | - | - | - |
| CO3 | S | S | S | M | M | M | - | - | - | - | - | - |
| CO4 | S | S | S | M | M | M | - | - | - | - | - | - |
| CO5 | S | S | S | M | M | M | - | - | - | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS:**

**Introduction to Innovation Management** - Innovation – What it is? Why it Matters? - Innovation as a Core Business Process – system thinking for innovation – Framework for System Thinking - system thinking tools

**Creating New Products and Services** - Product and Service Innovation – Exploiting Open Innovation and Collaboration –The Concept of Design Thinking and Its Role within NPD and Innovation – framework for design thinking

**Creating New Products and Services** - Product and Service Innovation – Exploiting Open Innovation and Collaboration –The Concept of Design Thinking and Its Role within NPD and Innovation – framework for design thinking

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**Capturing Innovation Outcome** - New Venture – Benefits of Innovation, and Learning from Innovation – Building Innovative Organization and Developing Innovation Strategy - Globalization for Innovations, Innovating for Emerging Economies and Role of National Governments in Innovation

**New Product Brand Development and Pricing Strategies** - Importance of Brand decisions and Brand identity development; Pricing of a new product, Pre-test Marketing

**The Product offer** Selecting Market opportunity and Designing new market offers-Concept Generation and Evaluation, Developing and Testing Physical offers - Pre-launch, during launch and Post launch preparations;

**Text Book:**

1. Joe Tidd, John Bessant (2013), Managing Innovation: Integrating Technological, Market and Organizational Change, 5th edition, Wiley.

**Reference Books:**

1. Schilling, M (2013), Strategic management of technological innovation, 4th edition, McGraw Hill Irwin.
2. Allan Afuah (2003), Innovation Management: Strategies, Implementation and Profits, 2nd edition, Oxford University Press.
3. Michael G. Luchs, Scott Swan, Abbie Griffin (2015), Design Thinking: New Product Development Essentials from the PDMA, Wiley-Blackwell.
4. John Boardman, Brian Sauser (2013), Systemic Thinking: Building Maps for Worlds of Systems, 1st edition, Wiley.
5. Rich Jolly (2015), Systems Thinking for Business: Capitalize on Structures Hidden in Plain Sight, Systems Solutions Press

**COURSE DESIGNERS:**


| S.No | Name of the faculty | Designation | Department | E-Mail Id |
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| 34121O07 | SOCIAL ENTREPRENEURSHIP | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

Social entrepreneurship involves the creativity, imagination and innovation often associated with entrepreneurship.

**PREREQUISITE -** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To provide students with a working knowledge of the concepts, opportunities and challenges of social entrepreneurship.. |
| 2 | To demonstrate the role of social entrepreneurship in creating innovative responses to critical social needs (e.g., hunger, poverty, inner city education, global warming, etc).. |
| 3 | To engage in a collaborative learning process to develop a better understanding of the context and domain of social entrepreneurship.. |
| 4 | To help prepare you personally and professionally for meaningful employment by reflecting on the issues of social entrepreneurship. |
| 5 | Engage with a diverse group of social entrepreneurs |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Explain the concept social entrepreneurship and distinguish its elements from across a continuum of organizational structures from traditional nonprofits to social enterprises to traditional for profits | Understand |
| CO2: Analyze the operations of a human service organization using social entrepreneurial orientation and industry assessment and diagnostic tools. | Apply |
| CO3: Apply the Social Business Model Canvas and lean startup methods for planning,developing, testing, launching and evaluating social change ventures. | Apply |
| CO4: Compare funding options for social change ventures. | Apply |
| CO5: The outcomes of social entrepreneurship are focused on addressing persistent socialproblems particularly to those who are marginalized or poor. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO 1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO8 | PO9 | PO1 0 | PO11 | P012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **CO1** | M | - | - | - | - | M | S | S | - | M | - | - |
| **CO2** | S | S | S | M | M | M | - | - | - | - | - | - |
| **CO3** | S | S | S | M | M | M | - | - | - | - | - | - |
| **CO4** | S | S | S | M | M | M | - | - | - | - | - | - |
| **CO5** | S | S | S | M | M | M | - | - | - | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS:**

**Social entrepreneurship** – dimensions of social entrepreneurship – social change theories – equilibrium and complexity – theory of social emergence

**Social entrepreneurs** – mindset, characteristics and competencies – developing a social venture sustainability model – feasibility study – planning – marketing challenges for social ventures

**Microfinance**– MFI (Micro Finance Institutions) in India – regulatory framework of MFI – Banks and MFIs

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– sustainability of MFI – Self Help Groups– successful MFI models

**Angel Investors & Venture Capitalists** – difference – valuation of firm – negotiating the funding agreement – pitching idea to the investor

**Corporate entrepreneurship** – behavioral aspects – identifying, evaluating and selecting the opportunity – venture– location – organization – control – developing business plan – funding the venture – implementing corporate venturing in organization.

**Text Book:**

1. Constant Beugré, Social Entrepreneurship: Managing the Creation of Social Value, Routledge, 2016.

2. Björn Bjerke, Mathias Karlsson, Social Entrepreneurship: To Act as If and Make a Difference, Edward Elgar Publishing, 2013.

**Reference Books:**

1. Wei-Skillern, J., Austin, J., Leonard, H., & Stevenson, H. (2007). Entrepreneurship in the Social Sector (ESS). Sage Publications.
2. Janus, K. K. (2017). Social startup success. New York, NY: Lifelong Books.
3. Dancin, T. M., Dancin, P. A., & Tracey, P. (2011). Social entrepreneurship: A critique and future directions.
4. Alex Nicholls, Social Entrepreneurship: New Models of Sustainable Social Change, OUP Oxford, 2008.
5. David Bornstein, Susan Davis, Social Entrepreneurship: What Everyone Needs to Know, Oxford University Press, 2010.

**COURSE DESIGNERS**

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| 34121O01 | ENGINEERING STARTUPS AND ENTREPRENEURIAL MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-IE | 3 | 0 | 0 | 3 |

**PREAMBLE:**

A startup means company initiated by individual innovator or entrepreneurs to search for a repeatable and scalable business model. More specifically, a startup is a newly emerged business venture that aims to develop a viable business model to meet a marketplace needs or wants in an optimum manner.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES:**

**1.** To understand the basics of Startups Management and components.

**2.** To analyze the startups fund management practices

**3.** To practice the various kinds of stocks and employment considerations in startups.

**4.** To apply the importance of intellectual property rights and its procedures.

**5.** To explore the entrepreneurial mindset and culture.

**COURSE OUTCOMES:**

**After successful completion of the course, students will be able to**

| | |
|---|---|
| **CO1:** Explain the concept of engineering startups, objectives and functions and its components. | Understand |
| **CO2:** Analyze the startups funding issues and remuneration practices in startups business. | Analyse |
| **CO3:** Analyze the various kinds of stocks and employment opportunities and consideration in startups business. | Analyse |
| **CO4:** Compare and contrast the various forms of intellectual property protection and practice. | Analyse |
| **CO5:** Explore the entrepreneurial mindset and culture that has been developing in companies of all sizes and industries. | Evaluates |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | - | - | - | M | M | S | - | M | - | M | - | L | L |
| CO2 | S | S | M | M | M | L | - | - | - | - | - | M | L | L | - |
| CO3 | S | S | S | M | M | M | - | - | - | - | - | M | L | - | M |
| CO4 | S | S | S | M | M | M | - | - | - | - | - | M | - | M | L |
| CO5 | S | S | - | M | M | M | - | - | - | - | - | M | M | M | M |

**S- Strong; M-Medium; L-Low**

**SYLLABUS:**

**Elements of a successful Start up:** Startup Process – Create Management Team and Board of Directors – Evaluate market and Target Customers – Define your product or service – preparation of business plan - specific problems and challenge in startup.

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**Funding Issues and Remuneration Practices:** Funding Issues: Investment Criteria – Looking for seed cash – Seed, Startup, and subsequent Funding Rounds – Milestone Funding - Remuneration Practices for your Start –up : Salaries – Equity Ownership – Other compensation – Employment Contracts

**Stock Ownership & startup Employment Considerations:** Stock ownership: Risk- Reward Scale – Ownership Interest over time – Common and preferred stock – Authorized and outstanding shares – Acquiring stock – Restricted Stock Grants – Future Tax Liability on Restricted Shares - Compensation and startup Employment Considerations : Entrepreneurs Need Insurance – Do Fringe benefits – outsourcing your benefits work – Life Insurance – Health Insurance – Disability Insurance

**Protecting Intellectual Property:** Protecting your intellectual property: Copyrights - patents–Trade secrets – Trademarks - The Legal Form of your Startup: Corporation – Partnership – Limited Liability Company – Sole Proprietorship - – Making the startup decision: commitment – Leaving a current employer - stay fit.

**Startup Capital Requirements and Legal Environment:**

Identifying Startup capital Resource requirements - estimating Startup cash requirements - Develop financial assumptions- Constructing a Process Map - Positioning the venture in the value chain - Launch strategy to reduce risks- Startup financing metrics - The Legal Environment- Approval for New Ventures- Taxes or duties payable for new ventures..

**Text Book:**


1. James A. Swanson & Michael L. Baird, "Engineering your start-up: A Guide for the High-Tech Entrepreneur" 2nd ed, Professional Publications.inc
2. Donald F Kuratko, " Entrepreneurship – Theory, Process and Practice", 9th Edition, Cengage Learning 2014.


**Reference Books:**


1. Hisrich R D, Peters M P, "Entrepreneurship" 8th Edition, Tata McGraw-Hill, 2013.
2. Mathew J Manimala, "Enterprenuership theory at cross roads: paradigms and praxis" 2nd Edition Dream tech, 2005.
3. Rajeev Roy, 'Entrepreneurship' 2nd Edition, Oxford University Press, 2011.
4. EDII "Faulty and External Experts – A Hand Book for New Entrepreneurs Publishers: Entrepreneurship Development", Institute of India, Ahmadabad, 1986.


**COURSE DESIGNERS:**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
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| 34121O06 | NEW VENTURE PLANNING AND MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-IE | 3 | 0 | 0 | 3 |

**PREAMBLE**

Contemporary methods and best practices for the entrepreneur to plan, launch, and operate a new venture and creation of a business plan

**PREREQUISITE -** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | An opportunity for self-analysis, and how this relates to success in an entrepreneurial environment. |
| 2 | Information and understanding necessary to launch and grow an entrepreneurial venture. |
| 3 | A realistic preview of owning and operating an entrepreneurial venture. |
| 4 | An entrepreneur must understand the diversity, emotional involvement, and workload necessary to succeed. |
| 5 | The opportunity to develop a business plan. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Explain the concept of new venture planning, objectives and functions and its components. | Understand |
| CO2: Analyze the business plan issues and remuneration practices in startups business. | Apply |
| CO3: Explore an entrepreneurial idea to the point where you can intelligently and decide whether to "go for it" or not. | Apply |
| CO4: Compare and contrast the different forms entrepreneurial environment in terms of their key differences and similarities. | Apply |
| CO5: Explore the business plan and business model canvas for your idea. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | P012 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | - | - | - | M | S | S | - | M | - | - |
| CO2 | S | S | S | M | M | M | - | - | - | - | - | - |
| CO3 | S | S | S | M | M | M | - | - | - | - | - | - |
| CO4 | S | S | S | M | M | M | - | - | - | - | - | - |
| CO5 | S | S | S | M | M | M | - | - | - | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS:**

**STARTING NEW VENTURE:** Opportunity identification - Search for new ideas - Sources of innovative ideas - Techniques for generating ideas - Entrepreneurial imagination &creativity - The role of creative thinking - Developing your creativity - Impediments to creativity.

**METHODS TO INITIATE VENTURES:** Pathways to new venture - Creating new ventures - Acquiring an existing venture - Advantages of acquiring an established venture - Examination of key issues – Franchising - How a franchise works and franchise law - Evaluating franchising opportunity.

**THE SEARCH FOR ENTREPRENEURIAL CAPITAL:** The venture capital market - Criteria for evaluating new venture proposals - Evaluating venture capitalists - stage of venture capital financing - Alternate sources of financing for Indian entrepreneurs - Bank funding - State financial corporations - Business incubators and facilitators - Informal risk capital - Angel investors.

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**THE MARKETING ASPECTS OF NEW VENTURE:** Developing a marketing plan - Customer analysis - Sales analysis - Competition analysis - Market research - Sales forecasting - Sales Evaluation - Pricing decisions.

**BUSINESS PLAN PREPARATION FOR NEW VENTURE:** Business plan concept - Pitfalls to avoid in business plan - Developing a well conceived business plan - Elements of a business plan - Harvest strategy - Form of business organization - Legal acts governing businesses in India .

**Text Book:**

1. The Successful Business Plan, Secrets & Strategies, Rhonda Abrams, Published by The Planning Shop Titan, Ron Chernow, Random House
2. Osterwalder, A. and Pigneur, Y. (2010). Business Model Generation: A Handbook for Visionaries, Game Changers, and Challengers, Hoboken, NJ: John Wiley & Sons

**Reference Books:**

1. Blackwell, E. (2011). How to Prepare a Business Plan: Create Your Strategy; Forecast Your Finances; Produce That Persuasive Plan. Kogan Page Publishers.
2. Levi, D. (2014). Group Dynamics for Teams. Sage Publications, Inc. Thousand Oaks.
3. Rajeev Roy, 'Entrepreneurship' 2nd Edition, Oxford University Press, 2011.
4. Business Model Generation by Osterwalder and Pigneur.

**COURSE DESIGNERS**

| S.No | Name of the faculty | Designation | Department | E-Mail Id |
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| 34121O02 | INTELLECTUAL PROPERTY RIGHTS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-IE | 3 | 0 | 0 | 3 |

**PREAMBLE:** The course is designed to introduce fundamental aspects of Intellectual property Rights to students who are going to play a major role in development and management of innovative projects in industries.

**PREREQUISITE:** NIL

**COURSE OBJECTIVES:**

1. To introduce fundamental aspects of Intellectual property Rights
2. To disseminate knowledge on patents and copyrights
3. To disseminate knowledge on trademarks, Design and Geographical Indication (GI),
4. To disseminate knowledge on Plant Variet, Layout Design Protection and create awareness about current trends in IPR
5. To disseminate knowledge on Legislation of IPRs and Alternate Dispute Resolution

**COURSE OUTCOMES:**

**After successful completion of the course, students will be able to**

| | |
|---|---|
| CO1: Understand the important of intellectual property rights | Understand |
| CO2: Apply for the patents | Apply |
| CO3: Understand and apply for the copyrights | Understand |
| CO4: Understand the important of trademarks | Apply |
| CO5: Appreciate the importance of IPR and its related issues | Understand |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | L | - | - | - | - | L | S | L | - | L | - | L | L | M | - |
| CO2 | L | S | S | M | M | L | - | - | - | - | - | L | M | L | - |
| CO3 | L | S | L | M | M | L | - | - | - | - | - | L | M | L | - |
| CO4 | L | S | S | S | M | L | - | - | - | - | - | L | L | L | - |
| CO5 | L | S | S | M | - | L | - | - | - | - | - | L | M | L | - |

**S- Strong; M-Medium; L-Low**

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**SYLLABUS:**

**Unit 1 - Overview of Intellectual Property**

Introduction and the need for intellectual property right (IPR) - Kinds of Intellectual Property Rights: Patent, Copyright, Trade Mark, Design, Geographical Indication, Plant Varieties and Layout Design – Genetic Resources and Traditional Knowledge – Trade Secret - IPR in India : Genesis and development – IPR in abroad - Major International Instruments concerning Intellectual Property Rights: Paris Convention, 1883, the Berne Convention, 1886, the Universal Copyright Convention, 1952, the WIPO Convention, 1967,the Patent Co-operation Treaty, 1970, the TRIPS Agreement, 1994.

**Unit 2 - Patents & Copyright**

**Patents** - Elements of Patentability: Novelty , Non Obviousness (Inventive Steps), Industrial Application - Non - Patentable Subject Matter - Registration Procedure, Rights and Duties of Patentee, Assignment and licence , Restoration of lapsed Patents, Surrender and Revocation of Patents, Infringement, Remedies & Penalties - Patent office and Appellate Board

**Copyright** - Nature of Copyright - Subject matter of copyright: original literary, dramatic, musical, artistic works; cinematograph films and sound recordings - Registration Procedure, Term of protection, Ownership of copyright, Assignment and licence of copyright - Infringement, Remedies & Penalties – Related Rights - Distinction between related rights and copyrights

**Unit 3 – Trademarks, Design and Geographical Indication (GI)**

**Trademarks:** Concept of Trademarks - Different kinds of marks (brand names, logos, signatures, symbols, well known marks, certification marks and service marks) - Non Registrable Trademarks - Registration of Trademarks - Rights of holder and assignment and licensing of marks - Infringement, Remedies & Penalties - Trademarks registry and appellate board

**Design:** Meaning and concept of novel and original - Procedure for registration, effect of registration and term of protection

**Geographical Indication (GI):** Meaning, and difference between GI and trademarks - Procedure for registration, effect of registration and term of protection

**Unit 4 - Plant Varieties, Layout Design and Indian National Intelectual Property Policy**

**Plant Variety Protection:** Plant variety protection: meaning and benefit sharing and farmers' rights – Procedure for registration, effect of registration and term of protection.

**Layout Design Protection:** Layout Design protection: meaning – Procedure for registration, effect of registration and term of protection.

**Indian National Intelectual Property Policy:** India`s New National IP Policy, 2016 – Govt. of India step towards promoting IPR – Govt. Schemes in IPR – Career Opportunities in IP - IPR in current scenario with case studies

**UNIT – V: Legislation of IPRs and Alternate Dispute Resolution**

**Legislation of IPRs:** The Patent Act of India, Patent Amendment Act (2005), Design Act, Trademark Act, Geographical

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Indication Act, Bayh- Dole Act - Patent Ownership and Transfer, Patent Infringement, International Patent Law

**Alternate Dispute Resolution:** Alternate Dispute Resolution and Arbitration – ADR Initiatives –Reason for Choosing ADR – Advantages and Disadvantages of ADR – Assessment of ADR's – Litigation – Arbitration - Effective Mechanism for Business Issues.

**Text Books:**

1. Nithyananda, K V. (2019). Intellectual Property Rights: Protection and Management. India, IN: Cengage Learning India Private Limited.
2. Neeraj, P., & Khusdeep, D. (2014). Intellectual Property Rights. India, IN: PHI learning Private Limited.

**Reference Book**:

1. Ahuja, V K. (2017). Law relating to Intellectual Property Rights. India, IN: Lexis Nexis.

**COURSE DESIGNERS:**

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| 34421O01 | 3D PRINTING AND ITS APPLICATIONS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**Preamble**

The course is designed to impart knowledge and skills related to 3D printing technologies, selection of material and equipment and develop a product using this technique in Industry 4.0 environment.

**Prerequisite – NIL**

**Course Objective**

| | |
|---|---|
| 1 | To discuss the basic concepts and procedure followed in 3D printing methods |
| 2 | To construct a CAD model for a required product |
| 3 | To identify the use of different material and support structures |
| 4 | To experiment with different 3d printing process |
| 5 | To identify the defects. |

**Course Outcomes: On the successful completion of the course, students will be able to**

| | | |
|---|---|---|
| CO1. | Demonstrate the various 3D Printing methods | Understand |
| CO2. | Develop CAD Models ,Import and Export CAD data and generate .STL file. | Apply |
| CO3. | Select a specific material for the given application. | Apply |
| CO4. | Select a 3D printing process for an application. | Apply |
| CO5. | Able to identify the Product defects after post processing | Apply |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| CO | PO1 | PO 2 | PO 3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO1 0 | PO1 1 | PO1 2 | PSO 1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | - | - | - | - | - | - | - | - | - | - | M | - | - |
| CO2 | S | S | M | - | M | - | - | - | - | - | - | - | M | - | - |
| CO3 | M | M | L | L | L | - | - | - | - | - | - | - | M | - | - |
| CO4 | S | M | - | - | M | - | - | - | - | - | - | - | M | - | - |
| CO5 | M | S | M | M | - | - | - | - | - | - | - | - | L | - | L |

**S- Strong; M-Medium; L-Low**

**SYLLABUS**

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| |
|---|
| **3D PRINTING & CAD FOR ADDITIVE MANUFACTURING (7 Hrs.)** |
| Introduction, Process, Classification, Advantages, Additive V/s Conventional Manufacturing processes, Applications. CAD Data formats, Data translation, Data loss, STL format. |
| **ADDITIVE MANUFACTURING TECHNIQUES (12Hrs.)** |
| Stereo- Lithography, LOM, FDM, SLS, SLM, Binder Jet technology. Process, Process parameter, Process Selection for various applications. Additive Manufacturing Application Domains: Aerospace, Electronics, HealthCare, Defence, Automotive, Construction, Food Processing, Machine Tools |
| **MATERIALS ( 8 Hrs.)** |
| Polymers, Metals, Non-Metals, Ceramics. Various forms of raw material- Liquid, Solid, Wire, Powder; Powder Preparation and their desired properties, Polymers and their properties.<br>Support Materials |
| **ADDITIVE MANUFACTURING EQUIPMENT (10 Hrs.)** |
| Process Equipment- Design and process parameters, Governing Bonding Mechanism<br>Common faults and troubleshooting, Process Design |
| **POST PROCESSING & PRODUCT QUALITY (8 Hrs.)** |
| Post Processing Requirement and Techniques , Product Quality Inspection and testing , Defects and their causes |

| **Text Books** | |
|---|---|
| **1** | Lan Gibson, David W. Rosen and Brent Stucker, "Additive Manufacturing Technologies:Rapid Prototyping to Direct Digital Manufacturing", Springer, 2010. |
| **2** | Khanna Editorial, "3D Printing and Design", Khanna Publishing House, Delhi. |
| **Reference Books** | |
| **1** | CK Chua, Kah Fai Leong, "3D Printing and Rapid Prototyping- Principles and Applications", World Scientific, 2017. |
| **2** | Andreas Gebhardt, "Understanding Additive Manufacturing: Rapid Prototyping, Rapid Tooling, Rapid Manufacturing", Hanser Publisher, 2011. |
| **3** | J.D. Majumdar and I. Manna, "Laser-Assisted Fabrication of Materials", Springer Series in Material Science, 2013. |

**Course Designers**

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| 34421O02 | INDUSTRIAL ROBOTICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**Preamble**

The objective of this course is to impart knowledge about industrial robots for their control and design.

**Prerequisite :**

**NIL**

**Course Objective**

| | |
|---|---|
| 1 | Be exposed to the fundamentals of robots |
| 2 | To learn about Robot kinematics and dynamics |
| 3 | To learn different types of sensors used in robots and its control |
| 4 | To understand the different types of actuation systems used in robots |
| 5 | To understand the robot control hardware and their interfacing and programming of robots. |

**Course Outcomes: On the successful completion of the course, students will be able to**

| | | |
|---|---|---|
| CO1. | Understand the basic configurations and kinematic systems of robots | Understand |
| CO2. | Solve problems of robot kinematics and dynamics | Apply |
| CO3. | Understand the different types of sensors used in robot systems and their applications, different types of control systems used in robots | Understand |
| CO4. | Understand and applications of the different types of actuators used in robot systems | Apply |
| CO5. | Understand the robot control hardware systems and their interfaces, different robot programming techniques for various applications. | Apply |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| CO | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | - | L | - | - | - | - | - | - | S | - | L |
| CO2 | S | S | M | M | - | M | - | - | - | - | - | - | S | - | L |
| CO3 | S | M | M | M | - | M | - | - | - | - | - | - | S | - | L |
| CO4 | S | S | M | M | - | L | - | - | - | - | - | - | S | - | L |
| CO5 | S | S | L | S | - | S | - | - | - | - | - | - | S | - | L |

**S- Strong; M-Medium; L-Low**

Dr. M. NITHYA,
Prof & Head.
Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

| SYLLABUS |
|---|
| **INTRODUCTION TO ROBOTICS** |
| Types and components of a robot, Classification of robots, closed-loop and open loop control systems. Kinematics systems; Definition of mechanisms and manipulators, Social issues and safety. |
| **ROBOT KINEMATICS AND DYNAMICS** |
| Kinematic Modelling: Translation and Rotation Representation, Coordinate transformation, DH parameters, Jacobian, Singularity, and Statics - Dynamic Modelling: Equations of motion: Euler-Lagrange formulation. |
| **SENSORS AND VISION SYSTEM and ROBOT CONTROL** |
| Sensor: Contact and Proximity, Position, Velocity, Force, Tactile etc. - Introduction to Cameras, Camera calibration, Geometry of Image formation, Euclidean/ Similarity/Affine/Projective transformations - Vision applications in robotics.<br>Basics of Robot control: Transfer functions, Control laws: P, PD, PID. - Non-linear and advanced controls. |
| **ROBOT ACTUATION SYSTEMS** |
| Actuators: Electric, Hydraulic and Pneumatic; Transmission: Gears, Timing Belts and Bearings, Parameters for selection of actuators. |
| **CONTROL HARDWARE AND INTERFACING** |
| Embedded systems: Architecture and integration with sensors, actuators, components, Programming for Robot Applications. |

**Text Books**

| | |
|---|---|
| **1** | Saha, S.K., "Introduction to Robotics, 2nd Edition, McGraw-Hill Higher Education, New Delhi, 2014. |
| **2** | Mittal R.K. and Nagrath I.J., "Robotics and Control", Tata McGraw Hill. |

**Reference Books**

| | |
|---|---|
| **1** | Ghosal, A., "Robotics", Oxford, New Delhi, 2006. |
| **2** | Niku Saeed B., "Introduction to Robotics: Analysis, Systems, Applications", PHI, New Delhi. |
| **3** | Steve Heath, "Embedded System Design", 2nd Edition, Newnes, Burlington, 2003 |
| 4 | Merzouki R., Samantaray A.K., Phathak P.M. and Bouamama B. Ould, "Intelligent Mechatronic System: Modeling, Control and Diagnosis", Springer. |

**Course Designers**

| S.No | Faculty Name | Designation | Department/Name of the College | Email id |
|---|---|---|---|---|
| 1 | Prof. J.Satheesbabu | Associate Professor | Mech/VMKVEC | satheesbabu@vmkvec.edu.in |

Dr. M. NITHYA,
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V.M.K.V. Engg. College, Salem.

| 36921O01 | BIOMOLECULES - STRUCTURE, FUNCTION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

Biomolecules like carbohydrates, proteins, fat are vital components of any living system. Basic knowledge about them helps in maintaining a healthy lifestyle, free of sickness and a general awareness about hygiene.

**PREREQUISITE** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To give an overview of importance of biomolecules |
| 2 | To elaborate the structure of proteins and nucleic acids and its role in disease. |
| 3 | To enumerate the role of carbohydrates and their cellular function in physiology and pathology |
| 4 | To enumerate the role of lipids and their cellular function in physiology and pathology. |
| 5 | To briefly cholesterol and its role in diseases |

**COURSE OUTCOMES**

After the successful completion of the course, learner will be able to

| | |
|---|---|
| CO1. Relate the basics of biomolecules in and around him | Understand |
| CO2. Understand the structure of biomolecules such as proteins and nucleic acids | Understand |
| CO3. Discover the role of carbohydrates in healthy and diseased conditions | Apply |
| CO4. Relate disfunctioning of lipids with disease | Analyse |
| CO5. Criticize the role of cholesterol in diseases. | Evaluate |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | L | - | - | L | - | - | - | - | - | - | - | L | - |
| CO2 | S | M | S | - | - | M | - | - | - | - | - | - | - | L | - |
| CO3 | M | L | M | M | - | S | - | - | - | - | - | - | - | L | - |
| CO4 | L | L | L | L | S | L | - | - | S | - | - | M | L | M | M |
| CO5 | S | - | L | L | - | M | - | - | - | - | - | S | S | M | - |

S- Strong; M-Medium; L-Low

Dr. M. NITHYA,
Prof & Head.
Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

**SYLLABUS**

**PROTEINS**

Protein – Structure – primary, secondary, tertiary. Types of proteins and their function. Role of each type of Protein in Health and Disease.

**NUCLEIC ACIDS**

Nucleic Acids – Components of nucleic acids, Conformational parameters. Nucleic acids – Types of DNA and RNA. DNA Polymorphism, Circular DNA, Supercoil DNA, DNA-Protein interactions. Role of nucelic acids in Health and disease

**CARBOHYDRATES**

Carbohydrates – Introduction. Types – monosaccharide, disaccharide, oligosaccharide and polysaccharides. Structure of each type. Artificial sugars. Role of carbohydrates in Health and Disease

**FATTYACIDS AND LIPIDS**

Fatty acids- Introduction, nomenclature, types - Saturated and unsaturated fatty acids, Essential and non-essential fatty acids.

Lipids – Introduction, Classification - simple and compound lipids, phospholipids, Cholesterol and its role in health and disease, Micelles and Liposomes : Applications in biology and medicine

**CELL MEMBRANE AND CELL SIGNALING**

Cell membrane - components and architecture, Various membrane models including Fluid-mosaic model. Ion channels, Receptors, Signaling molecules, Signaling mechanism, Role of cell signaling in Health and Disease. Inter-relationship of biomolecules.

**TEXTBOOKS**

1. Biophysical Chemistry, Part II, Techniques for the study of biological structure and function, by Cantor C.R. and Schimmel P R., W.H. Freeman and Company, 1980.
2. Nucleic Acids in chemistry and Biology, by Blackburn G.M. and gait M.J., IRL Press, 1990.
3. Biochemistry, by Voet D. and Voet J.G., John Wiley and sons, 1995.
4. Physical Biochemistry, by Freifelder D., W.H. Freeman and company, 1976-1982.

**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr.P.David Annaraj | Assistant professor | Pharmaceutical Engineering | davidannaraj@vmkvec.edu.in |
| 2 | Ms.S.Sowmiya | Assistant Professor | Pharmaceutical Engineering | sowmiya.vmkvec@vmrf.edu.in |

Dr. M. NITHYA,
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V.M.K.V. Engg. College, Salem.

| 36921O02 | PHARMACOGENOMICS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

Pharmacogenomics involves the study of the relationship between an individual's genetic makeup and his or her response to a drug. Pharmacogenetics, a component of pharmacogenomics, is the study of the relationship between a single gene and its response to a drug.

**PREREQUISITE -** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Discuss about the basic knowledge about pharmacogenomics and drug design using genomic applications for drug action and toxicity. |
| 2 | Perform how individualization of drug therapy can be achieved based on a person's genetic makeup while reducing unwanted drug effects. |
| 3 | Outline the Pharmacogenomics studies on how genetic differences between individuals can affect responses to various drugs. |
| 4 | Formulate on medicine skills acquired by the student and his action in different pathologies |
| 5 | Develop acquire knowledge about the influence of genetic alterations on the therapeutic effect and adverse reactions of the drugs, from a perspective of individualized therapy. |

**COURSE OUTCOMES**

After the successful completion of the course, learner will be able to

| | |
|---|---|
| CO1.Recognize the effect of genetic differences between individuals in the outcome of drug therapy and in drug efficacy and toxicity. | Remember |
| CO2. Describe the role of single nucleotide polymorphism as a biomarker for the prediction of risk, therapeutic response and prognosis of malignancies. | Understand |
| CO3. Utilize and manage the new genomics based tools as they become available as well as make best treatment choices. | Understand |
| CO4. Examine the applications of genomics principles in drug action and toxicology | Analyze |
| CO5. Validation of case studies related to pharmacogenomics | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | L | L | L | L | L | L | L | - | L | L | L | L | L | L | |
| CO2 | M | M | M | M | L | - | - | - | M | - | L | L | L | L | - |
| CO3 | S | S | S | S | L | - | - | - | M | - | L | L | L | L | |
| CO4 | M | M | M | M | M | - | - | - | S | - | L | L | M | L | - |
| CO5 | L | L | L | L | S | - | - | - | M | - | M | M | S | M | - |

S- Strong; M-Medium; L-Low

Dr. M. NITHYA,
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V.M.K.V. Engg. College, Salem.

**SYLLABUS**

**PHARMACOGENOMICS AND PERSONALIZED MEDICINE**

Pharmacogenetics - Roots of pharmacogenomics and it is not just pharmacogenomics, Genetic drug response profiles, the effect of drugs on Gene expression, pharmacogenomics in drug discovery and drug development. Concept of individualized drug therapy, Drivers and the promise of personalized medicine, Strategies for application of pharmacogenomics to customize therapy,Barriers.

**HUMAN GENOME**

Expressed sequence Tags (EST) and computational biology, Microbial genomics, computational analysis of whole genomes, computational genome analysis, Genomic differences that affect the outcome of host pathogen interactions, Protein coding genes, repeat elements, genome duplication, analysis of proteome, DNA variation, Biological complexity. Single nucleotide polymorphisms (SNP's) in Pharmacogenomics - approaches, number and types of SNPs, Study design for analysis, Analytical issues, Development of markers.

**ASSOCIATION STUDIES IN PHARMACOGENOMICS**

Viability and Adverse drug reaction in drug response, Multiple inherited genetic factors influence the outcome of drug treatments, Association studies in pharmacogenomics, Strategies for pharmacogenomics Association studies, Benefits of Pharmacogenomics in Drug R & D.

**GENOMICS APPLICATIONS FOR DRUG ACTION, TOXICITY AND DESIGN**

Platform technologies and Pharmaceutical process, its applications to the pharmaceutical industry, Understanding biology and diseases, Target identification and validation, Drug candidate identification and optimization, safety and toxicology studies. The need of protein structure information, protein structure and variation in drug targets-the scale of problem, Mutation of drug targets leading to change in the ligand binding pocket.

**PHARMACOGENOMICS – CASE STUDIES**

Study of pharmacogenomics of human P-Glycoprotein, drug transporters, lipid lowering drugs, chemotherapeutic agents for cancer treatment.

**TEXT BOOKS**

1. Martin M. Zdanowicz, M.M. "Concepts in Pharmacogenomics" Second Edition, American Society of Health-System Pharmacists, 2017.

2. Licinio, J and Wong, Ma-Li. “Pharmacogenomics: The Search for the Individualized Therapies”, Wiley-Blackwell, 2009.
3. Yan Q, “Pharmacogenomics in Drug Discovery and Development” Humana Press, 2nd Edition, 2014.

**REFERENCES**

1. Brazeau, D.A. and Brazeau, G.A. “Principles of the Human Genome and Pharmacogenomics” American Pharmacist Association, 2011
2. Werner, K., Meyer, U.A., Tyndale, R.F. “Pharmacogenomics”, Second Edition, Taylor and Francis, 2005.
3. Langman, L.J. and Dasgupta, A. "Pharmacogenomics in Clinical Therapeutics", Wiley – Blackwell, 2012

**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Ms. R. Jaishri | Assistant Professor | Pharmaceutical Engineering | jaishri@vmkvec.edu.in |

Dr. M. NITHYA,
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V.M.K.V. Engg. College, Salem.

| 34221O02 | MUNICIPAL SOLID AND WASTE MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**Preamble**

Structure is an arrangement and organization of interrelated elements in a material objector system,or the object or systems organized.Material structures include an objects such as buildings and machines and natural objects suchas biological organisms,minerals and chemicals.

**Prerequisite: Nil**

**Course Objectives**

| | |
|---|---|
| 1. | The on-site/off-site processing of the same and the disposal methods. |
| 2. | The student is expected to know about the various effects and disposal options for the municipal solid waste. |
| 3. | The collection and supply of water |
| 4. | The offsite processing involved in site |

**Course Outcomes**

On the successful completion of the course, students will be able to

| | |
|---|---|
| Co1.To know about the types of waste & Sources | Analyze |
| Co2.To Study the on site Storage & Processing | Apply |
| Co3.To study about the collection & transfer the waste | Apply |
| Co4.To Study the process of offsite processing | Apply |
| CO5.To know about the solid waste disposal | Apply |

**Mapping with Programme Outcomes and Programme Specific Outcomes**

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | - | - | - | - | - | - | - | - | - | - | S |
| CO2 | S | M | L | S | - | - | - | - | - | - | - | - | - | - | S |
| CO3 | S | M | M | S | - | - | - | - | - | - | - | - | - | - | S |
| CO4 | S | M | M | M | - | - | - | - | - | - | - | - | - | - | S |
| CO5 | S | M | M | - | - | - | - | - | - | - | - | L | - | - | S |

S-Strong; M-Medium; L-Low

Dr. M. NITHYA,
Prof & Head.
Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

**Syllabus**

**SOURCES AND TYPES OF MUNICIPAL SOLID WASTES**

Sources and types of solid wastes-major legislation-monitoring responsibilities-Effects of disposal of solid wastes - Quantity – factors affecting generation of solid wastes; characteristics – methods of sampling and characterization– public health effects. Principle of solid waste management – social & economic aspects; Public awareness; Role of NGOs; Legislation.

**ON-SITE STORAGE&PROCESSING**

On-site storage methods–materials used for containers–on-site segregation of solid wastes–public health&economic aspects of storage–options under Indian conditions–Critical Evaluation of Options.

**COLLECTIONANDTRANSFER**

Methods of Collection – types of vehicles – Manpower requirement – collection routes; transfer stations – selection of location, Anaerobic digestion, RDF and Incineration and co-generation of energy using waste, Pyrolysis of solid Waste operation & maintenance; options under Indian conditions.

**OFF-SITE PROCESSING**

Processing techniques and Equipment; Resource recovery from solid wastes – composting, incineration, Pyrolysis –options under Indian conditions- cradle to grave management concept, Prevailing laws of hazardous waste management- Risk assessment.

**DISPOSAL**

Dumping of solid waste;sanitary landfills–site selection,design and operation of sanitary landfills–Leachate collection & treatment.

**TextBooks**


1. GeorgeTchobanoglouset.al.,“IntegratedSolidWasteManagement”,McGraw-HillPublishers,2002.
2. B.Bilitewski,G.HardHe, K.Marek, A.Weissbach, and H.Boeddicker, “Waste Management”,Springer, 1994.
3. Charles A. Wentz; "Hazardous Waste Management", McGraw-Hill Publication, Latest publication, (1992).


**ReferenceBooks**


1. R.E.LandrethandP.A.Rebers,“MunicipalSolidWastes–problemsandSolutions”,LewisPublishers, 1997.
2. BhideA.D.andSundaresan,B.B.,“SolidWasteManagementinDevelopingCountries”,INSDOC,1993.
3. Handbook of Solid Waste Management by Frank Kreith, George Tchobanoglous, McGraw Hill Publication, (2002).
4. Bagchi, A., Design, Construction, and Monitoring of Landfills, (2nd Ed). Wiley Interscience, ISBN: 0-471-30681-9.
5. Manual on Municipal Solid Waste Management, CPHEEO, Ministry of Urban Development, Government of India, New Delhi, (2000).



| S.No. | NameoftheFaculty | Designation | Department | MailID |
|---|---|---|---|---|
| 1 | Mrs.P.Subathra | AssistantProfessor | Civil/AVIT | subathra@avit.ac.in |


Dr. M. NITHYA,
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Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

| 34221O01 | DISASTER RISK MANAGEMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**Preamble**

This course deals with the various disasters and to expose the students about the measures ,its effect against built structures , and Hazard Assessment procedure in India. This course also deals with the methods of mitigating various hazards such that their impact on communities is reduced.

**Prerequisite**

NIL

**CourseOutcomes**

| | |
|---|---|
| 1 | To Understand basic concepts in Disaster Management |
| 2 | To Understand Definitions and Terminologies used in Disaster Management |
| 3 | To Understand the Challenges posed by Disasters |
| 4 | To understand Impacts of Disasters |

**COURSEOUTCOMES**

On the successful completion of the course,students will be able to

| | |
|---|---|
| CO1.Understand the various types of disaster viz Hydrological,Coastal and Marine Disasters,Atmospheric Disasters,Geological,Mass Movement and Land Disasters, Wind and Water Driven Disasters. | Understand |
| CO2.Identify the potential deficiencies of existing buildings for Earthquake disaster and suggest suitable remedial measures. | Understand |
| CO3.Derive the guidelines for the precautionary measures and rehabilitation measures for Earthquake disaster. | Apply |
| CO4.Derive the protection measures against floods,cyclone,landslides | Apply |
| CO5.Understand the effects of disasters on built structures in India | Understand |

**MAPPINGWITHPROGRAMMEOUTCOMESANDPROGRAMMESPECIFICOUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO 2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | - | - | L | - | - | - | - | - | - | - | - | L | - | - |
| CO2 | M | M | L | L | - | M | - | - | - | - | - | - | L | - | - |
| CO3 | S | M | S | M | - | L | - | M | - | - | - | - | M | L | - |
| CO4 | S | M | S | - | L | - | - | - | - | - | - | - | M | L | - |
| CO5 | L | L | - | L | - | - | - | - | - | - | - | - | L | - | - |

S-Strong;M-Medium;L-Low

Dr. M. NITHYA,
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Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

**SYLLABUS**

**INTRODUCTION:**

Concept of disaster;Different approaches; Concept of Risk; Levels of disasters; Disaster phenomena and events (Global, national and regional); Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire
etc Dos and Don'ts during various types of Disasters.

**RISKASSESSMENTANDVULNERABILITYANALYSIS:**

Response time, frequency and forewarning levels of different hazards;Characteristics and damage potential of natural hazards;hazard assessment;Dimensions of vulnerability factors; vulnerability assessment; Vulnerability and disaster risk; Vulnerabilities to flood and earthquake hazards

**DISASTER MANAGEMENT MECHANISM:**

Concepts of risk management and crisis management; Disaster management cycle; Response and Recovery;Development,Prevention,Mitigation and Preparedness; Planning for relief, Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster

**DISASTER RESPONSE:**

Mass media and disaster management; Disaster Response Plan; Communication, Participation,and Activation of Emergency Preparedness Plan; Logistics Management; Psychological Response; Trauma and Stress Management; Rumour and Panic Management; Minimum Standards of Relief; Managing Relief;Funding.

**DISASTER MANAGEMENT IN INDIA:**

Strategies for disaster management planning; Steps for formulating a disaster risk reduction plan; Disaster management Act and Policy in India; Organisational structure for disaster management in India;Preparation of state and district disaster management plans, , Structural-nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake- holders

**TEXTBOOKS:**


1. Singhal J.P. "Disaster Management", Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423 2.
2. Tushar Bhattacharya, "Disaster Science and Management", McGraw Hill India Education Pvt. Ltd., 2012. ISBN-10:1259007367, ISBN-13: 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.


**REFERENCES:**


1. AbarquezI.&MurshedZ.Community Based DisasterRiskManagement:Field Practitioner's Handbook,AD PC,Bangkok,2004.
2. Goudie,A.Geomorphological echniques, UnwinHyman,London1990.
3. Goswami,S.C.Remote Sensing Application in NorthEastIndia,PurbanchalPrakesh,Guwahati,1997.
4. ManualonNaturalDisasterManagementinIndia,NCDM,NewDelhi,2001.
5. DisasterManagementinIndia,MinistryofHomeAffairs,GovernmentofIndia,NewDelhi,2011.
6. NationalPolicyonDisasterManagement,NDMA,NewDelhi,2009.
7. DisasterManagementAct.(2005),MinistryofHomeAffairs,GovernmentofIndia,NewDelhi,2005.


**CourseDesigners**

| S.No. | NameoftheFaculty | Designation | Department | MailID |
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| 1 | Ms.S.IsparaXavier | AssistantProfessor | Civil/AVIT | isparaxavier.civil@avitmch |

Dr. M. NITHYA,
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| 34621O01 | GREEN POWER GENERATION SYSTEMS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

The course presents the various sources of renewable energy including wind, solar, and biomass as potential sources of energy and investigates the contribution they can make to the energy profile of the nation. The technology used to harness these resources will be presented. Discussions of economic, environment, politics and social policy are integral components of the course.

**PREREQUISITE:** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Understand the nexus between energy, environment, and sustainable development |
| 2 | Appreciate energy ecosystems and its impact on environment |
| 3 | Learn basics of various types of renewable and clean energy technologies |
| 4 | Serve as bridge to advanced courses in renewable energy |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1: Explain renewable energy sources & systems. | Understand |
| CO2: Apply engineering techniques to build solar, wind, tidal, geothermal, biofuel, fuel cell, Hydrogen, and sterling engine. | Apply |
| CO3: Analyze and evaluate the implication of renewable energy. Concepts in solving numerical problems pertaining to solar radiation geometry and wind energy systems. | Analyze |
| CO4: Demonstrate self -learning capability to design & establish renewable energy systems. | Analyze |
| CO5: Conduct experiments to assess the performance of solar PV, solar thermal and biodiesel systems | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | - | - | - | M | - | L | L | - | - | - | - | M | - | - |
| CO2 | S | M | S | L | M | - | L | M | - | M | - | - | - | - | - |
| CO3 | S | - | - | - | M | - | - | M | M | - | - | - | L | - | - |
| CO4 | S | - | - | - | M | - | L | - | - | - | - | M | - | - | - |
| CO5 | S | M | S | L | M | - | L | M | - | M | M | - | M | L | - |
| CO6 | S | - | - | - | M | - | L | L | - | - | - | - | - | - | - |

S- Strong; M-Medium; L-Low

Dr. M. NITHYA,
Prof & Head,
Dept. of Computer Science & Engg
V.M.K.V. Engg. College, Salem.

**SYLLABUS**

**ENERGY**

Introduction to the nexus between energy, environment and sustainable development, Energy sources overview and classification, sun as the source of energy, fossil fuel reserves and resources - overview of global/ India's energy scenario. Energy consumption models – Specific Energy Consumption

**ECOLOGY AND ENVIRONMENT**

Concept and theories of ecosystems, - energy flow in major man-made ecosystems- agricultural, industrial and urban ecosystems - sources of pollution from energy technologies and its impact on atmosphere - air, water, soil, and environment - environmental laws on pollution control, The environmental protection act: Effluent standards and ambient air quality, innovation and sustainability, eco-restoration: Phyto-remediation.

**RENEWABLE SOURCES OF ENERGY**

Solar Energy: Solar radiation: measurements and prediction. Indian's solar energy potential and challenges, solar energy conversion principles and technologies: Photosynthesis, Photovoltaic conversion, and Photo thermal energy conversion. Wind Energy: Atmospheric circulations, atmospheric boundary layers, classification, factors influencing wind, wind shear, turbulence, wind energy basics and power Content, wind speed monitoring, Betz limit, wind energy conversion system: classification, characteristics, and applications. Ocean Energy: Ocean energy resources-ocean energy conversion principles and technologies: ocean thermal, ocean wave & ocean tide

**BIOENERGY**

Biomass as energy resources; bio-energy potential and challenges, Classification, and estimation of biomass; Source and characteristics of biofuels: Biodiesel, Bioethanol, Biogas. Types of biomass energy conversion systems - waste to energy conversion technologies

**OTHER ENERGY SOURCES AND SYSTEMS**

Hydropower, Nuclear fission, and fusion-Geothermal energy: Origin, types of geothermal energy sites, site selection, geothermal power plants; hydrogen energy, Magneto-hydro-dynamic (MHD) energy conversion – Radioisotope Thermoelectric Generator (RTG), Bio-solar cells, battery & super capacitor, energy transmission and conversions.

**TEXTBOOKS:**


1. Energy and the Environment, Ristinen, Robert A. Kraushaar, Jack J. AKraushaar, Jack P. Ristinen, Robert A., 2nd Edition, John Wiley, 2006,
2. Energy and the Challenge of Sustainability, World Energy assessment, UNDP, N York, 2000.


**REFERENCE BOOKS:**


1. Ocean Energy: Tide and Tidal Power by R. H. Charlier and Charles W. Finkl, Springer 2010
2. Introduction to Electrodynamics (3rd Edition), David J. Griffiths, Prentice Hall, 2009


**COURSE DESIGNERS**

| S. No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr. R. Devarajan | Professor | EEE | devarajan@vmkvec.edu.in |
| 2 | Mr. R. Sathish | Assistant Professor | EEE | sathish@vmkvec.edu.in |
| 3 | Mr. V.Rattankumar | Assistant Professor | EEE | rattankumar@avit.ac.in |

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| 34621O02 | INDUSTRIAL DRIVES AND AUTOMATION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**Preamble**

To introduce foundation on the principles of drives & automation and their elements with the implementation.

**PREREQUISITE :** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To explore the various AC,DC & Special Machine Drives for industrial Application |
| 2 | To study about the various Open loop and closed loop control schemes for drives |
| 3 | To know about hardware implementation of the controllers using PLC |
| 4 | To study the concepts of Distributed Control System |
| 5 | To understand the implementation of SCADA and DCS |

**COURSE OUTCOMES**

**On successful completion of the course, the students will be able to**

| | | |
|---|---|---|
| CO 1 | To understand working principles of various types of motors, differences, characteristics and selection criteria. | Understand |
| CO 2 | To apply the knowledge in selection of motors, heating effects and braking concepts in various industrial applications | Apply |
| CO 3 | To explain control methods of special drives | Understand |
| CO 4 | To carry out programming using PLC and use of various PLCs to Automation problems in industries. | Understand |
| CO 5 | To discuss supervisory control and data acquisition method and use the same in complex automation areas | Understand |
| CO6 | To understand and use logical elements and use of Human Machine Interfacing devices to enhance control & communication aspects of Automation | Understand |

Mapping with Programme outcomes and Programme Specific Outcomes

| COs | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | L | - | | S | S | - | | L | - | - | - | - | L |
| CO2 | M | - | M | - | S | L | M | - | M | L | - | - | L | - | - |
| CO3 | M | - | M | - | S | L | M | - | | L | - | - | - | M | - |
| CO4 | S | - | S | - | S | M | M | L | - | L | M | - | - | - | L |
| CO5 | S | M | S | S | S | M | S | - | M | L | L | M | - | L | M |

**INTRODUCTION**

Working principle of synchronous, Asynchronous & stepper motors, Difference between Induction and servo motors, Torque v/s speed characteristics, Power v/s. Speed characteristics, Vector duty induction motors, Concepts of linear and frameless motors, Selection of feedback system, Duty cycle, , V/F control, Flux Vector control.

**INDUSTRIAL DRIVES**

Electric drive – Definition – Parts – Types -Individual – Group – Multi motor. Stepper motor – Definition – Step angle – Slewing rate -Types -Variable reluctance -Hybrid – Closed loop control of stepper motor – Drive system(any one) – logic sequencer – Optical encoder. Servo motor – Definition – Types -DC servo motor – Permanent magnet DC motors – Brushless motor – AC servo motor -Working of an AC servo motor in control system – Induction motors – Eddy current drive for speed control of induction motors.

**PROGRAMMABLE LOGIC CONTROLLER**

Definition Conventional Hard wired logicRelays- Features of PLC- Advantages of PLC over relay logic – Block diagram of PLC -Programming basics of PLC – Ladder logic -Symbols used in ladder logic – Logic functions – Timers – Counters – PLC networking – Steps involved in the development of Ladder logic program – Program execution and run operation by PLC – Ladder logic diagram for liquid level operation. List of various PLCs and their manufactures.

**DISTRIBUTED CONTROL SYSTEM**

Evolution of distributed control system -Definition of DCS – Functional elements of DCS – Elements of local control unit -Interfaces-Types of information displays – Architecture of anyone commercial DCS – Advantages of DCS -Selection of DCS – List of various DCS and their manufactures.

**SUPERVISORY CONTROL & DATA ACQUISITIONS**

Introduction to Supervisory control & data Acquisitions, distributed Control System (DCS): computer networks and communication in DCS. different BUS configurations used for industrial automation – GPIB, HART and OLE protocol, Industrial field bus – FIP (Factory Instrumentation Protocol), PROFIBUS (Process field bus), Bit bus. Interfacing of SCADA with controllers, Basic programming of SCADA, SCADA in PC based Controller / HMI.

**TEXTBOOK**


1. G.K.Dubey, Fundamentals of Electrical Drives', Narosa Publication,2002.
2. FrankD.petruzellaprogrammable logic controlsthird edition TATA mc graw-hill edition 2010.
3. M.S.Berde, Electric Motor Drives Khanna publishers.2008


**REFERENCES**


1. Pradheepkumarsrivastava, Programmable logic controllers with applications', BPB publications.2004.
2. John W.Webb, Ronald A.Reis, Programmable logic controllers-Principles and Applications', Fifth Edition, Prentice Hall of India.
3. Michel P.Lukas, Distributed Control system', van Nostrand Reinhold Co, 1986
4. R.SrinivasanSpecial electrical Machines lakshmi publication.2012
5. Process Control Instrumentation Technology, Johnson Curties, Prentice hall of India, 8th edition
6. Andrew Parr, Industrial drives, Butterworth – Heineaman


**COURSE DESIGNERS**


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| 38121O01 | FOOD AND NUTRITION TECHNOLOGY | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

The course aims to enable the students to understand the physico chemical, nutritional, microbiological and sensory aspects, To familiarize the students about the processing and preservation techniques. To emphasize the importance of food safety, food quality, food plant¬ sanitation, food laws and regulations, food engineering and packaging in food industry.

**PREREQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Understand the tradition food processing techniques and the basics concept of food biochemistry |
| 2 | Demonstrate the product development technique, quality and contaminant check |
| 3 | To articulate their technical knowledge for industrial purpose |
| 4 | Describe national food laws and standards |
| 5 | Laws and qualities of standard for food products |

**COURSE OUTCOMES**

After the successful completion of the course, learner will be able to

| | |
|---|---|
| CO1: Recall the processing techniques practiced in olden days and the biological process | Remember |
| CO2. Illustrate the methods for animal product development, quality control and also screen the contaminant | Understand |
| CO3.Transfer the techniques in scaling up for industrial needs | Apply |
| CO4. Interpret and Troubleshoot instruments to maintain accuracy | Apply |
| CO5. Develop standards for food additives | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO1 | PO1 | PO1 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | - | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO2 | - | M | - | - | - | - | - | - | - | - | - | - | - | - | - |
| CO3 | L | M | S | M | L | - | - | - | - | - | - | - | M | L | - |
| CO4 | M | S | S | M | L | - | - | - | - | - | - | - | S | S | - |
| CO5 | - | S | S | M | M | - | - | - | - | - | - | M | L | S | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**INTRODUCTION TO FOOD BIOTECHNOLOGY**

Introduction, History and scope of food Biotechnology, development and prospects of biotechnology in animal products, ancient and traditional food processing techniques; Biochemical and metabolic pathways of biological systems used in food production.

**METHODS IN FOOD BIOTECHNOLOGY:** Role of biotechnology in productivity of livestock, Modern biotechnological methods and processes in animal product development, chemical and physical factors required for growing microbial cultures in nutritive substrate; Meat species identification, Quality control, Screening products for contaminants

**BIOTECHNOLOGY METHODS IN FOOD PROCESSING:**

Use of biotechnology in the production of food additives, use of biotechnological tools for the processing and preservation and foods of animal origin, use of biotechnology improved enzymes in food processing industry, Basic principles of the industrial use of bio-reactions for production of biomass-upstream and downstream processing application of microorganisms as starter cultures in meat industry, microbial production of food ingredients; Biosensors and novel tools and their application in food science.

**FOOD SAFETY & SECURITY**:

Consumer concerns about risks and values, biotechnology & food safety, Ethical issues concerning GM foods; testing for GMOs; current guidelines for the production, release and movement of GMOs; Future and applications of food biotechnology in India.

**TEXT BOOKS:**

1. Potter, Norman. M. Food Science, 5th Ed. Springer US
2. Manay, S.; Shadakshara Swamy, M., (2004). Foods: Facts and Principles, 4 th Ed. New Age Publishers.
3. B. Srilakshmi., (2002) Food Science, New Age Publishers..

**REFERENCES:**

**1.** Meyer, (2004). Food Chemistry. New Age
**2.** Deman JM. (1990) Principles of Food Chemistry. 2 nd Ed. Van Nostrand Reinhold, NY
**3.** Ramaswamy H and Marcott M. Food Processing Principles and Applications. CRC Press

**COURSE DESIGNERS**



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| 38121O02 | INTRODUCTION TO BIO-FUELS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

PREAMBLE

This course will provide an overview of existing energy utilization, production and infrastructure. We will also cover the consequences of our energy choices on the environment. The topics covered will include the chemistry of bio-fuels, the biology of important feed stocks, the biochemical, genetic and molecular approaches being developed to advance the next generation of bio-fuels and the economical and global impacts of bio-fuel production.

**PREREQUISITE –** NIL

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Students will recognize the types and differences between existing energy resources, understand their procurement and utilization, and their impacts on society and the environment |
| 2 | Students will be knowledgeable of the existing and potential future sources of renewable energy, and be able to intelligently analyze reported aspects of the energy and renewable energy fields. |

**COURSE OUTCOMES**

After the successful completion of the course, learner will be able to

| | |
|---|---|
| CO1. Understand the existing and emerging biomass to energy technologies | Remember |
| CO2. Understand the concept of 1st generation, 2nd generation and advance biofuels | Understand |
| CO3. Appraise the techno-economic analyses of biofuel conversion technologies | Understand |
| CO4. To articulate the concept of a biorefinery system and be able to develop major unit operations of an integrated biorefinery | Apply |
| CO5. Illustrate the environmental implications | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | - | L | - | M | - | S | L | - | - | - | - | S | - | L |
| CO2 | - | S | S | - | M | - | L | - | - | - | - | - | - | S | L |
| CO3 | S | M | - | M | - | M | - | L | L | - | - | - | S | - | L |
| CO4 | - | S | M | - | M | L | L | - | - | - | - | - | - | S | M |
| CO5 | - | - | - | - | - | - | - | S | M | - | - | - | - | - | L |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**OVERVIEW OF BIOFUELS**

Generation of biofuels − Development of biological conversion technologies − Integration of biofuels into biorefineries − Energy security and supply − Environmental sustainability of biofuels − Economic sustainability of biofuels.

**BIODIESEL**

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Biodiesel − Microorganisms and raw materials used for microbial Oil production − Treatment of the feedstocks prior to production of the Biodiesel − Current technologies of biodiesel production − Purification of biodiesel; Industrial production of biodiesel − Biodiesel production from single cell oil.

**BIOETHANOL**

Bioethanol – Properties – Feedstocks − Process technology − Pilot plant for ethanol production from lignocellulosic feedstock − Environmental aspects of ethanol as a biofuel.

**BIOMETHANE AND BIOHYDROGEN**

Biomethanol − Principles, materials and feedstocks − Process technologies and techniques − Advantages and limitations − Biological hydrogen production methods − Fermentative hydrogen production − Hydrogen economy − Advantages and limitations.

**OTHER BIOFUELS**

Biobutanol production − Principles, materials and feedstocks − Process technologies – Biopropanol – Bioglycerol − Production of bio-oils via catalytic pyrolysis − Life-Cycle environmental impacts of biofuels and Co-products.

**TEXT BOOKS:**

**1.** Luque, R., Campelo, J.and Clark, J. Handbook of biofuels production, Woodhead Publishing Limited 2011 2. Gupta, V, K. and Tuohy, M, G. Biofuel Technologies, Springer, 2013 3. Moheimani, N. R., Boer, M, P, M, K, Parisa A. and Bahri, Biofuel and Biorefinery Technologies, Volume 2, Springer, 2015

**REFERENCES:**

1. Eckert, C, A. and Trinh, C, T. Biotechnology for Biofuel Production and Optimization, Elsevier, 2016 2. Bernardes, M, A, D, S. Biofuel production – recent developments and prospects, InTech, 2011

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| 35321O03 | PRINCIPLES OF BIOMEDICAL INSTRUMENTATION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

To enable the students to develop knowledge of principles, design and applications of the Biomedical Instruments.

**PREREQUISITE – NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To know about bio-electric signals, electrodes and its types. |
| 2 | To know the various Bio-potential recording methods. |
| 3 | To study about patient monitoring concept and various Physiological measurements methods. |
| 4 | To study the principle of operation blood flow meter, blood cells counter. |
| 5 | To study about bio chemical measurements and details the concept of bio-telemetry and patient safety. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Explain the different Bio signal or bio-potential. | Understand |
| **CO2.** Discuss the working principles of diagnostic and therapeutic equipment's. | Understand |
| **CO3.** Examine the various instruments like as ECG, EMG, EEG, X-ray machine. | Apply |
| **CO4.** Illustrate medical instruments based on principles and application used in hospital. | Analyze |
| **CO5.** Analyze and calibrate fundamental biomedical instrumentation used in hospital. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | -- | -- | - | -- | -- | -- | -- | -- | -- | -- | L | M | -- | -- |
| CO2 | M | -- | -- | -- | -- | -- | -- | -- | L | -- | -- | L | M | -- | -- |
| CO3 | S | S | M | S | M | -- | -- | -- | M | -- | -- | M | M | M | S |
| CO4 | S | M | M | M | L | -- | -- | L | S | L | -- | S | M | S | S |
| CO5 | S | S | M | M | L | M | -- | L | S | L | -- | S | M | S | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**BIOELECTRIC SIGNALS AND ELECTRODES**

Basic medical instrumentation system, Origin of Bio electric Potential, Recording electrodes – Electrode Tissue

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interface, Electrolyte – skin interface, Polarization, Skin contact impedance, motion artifacts. Electrodes – Silver – silver chloride electrodes, electrodes for ECG, electrodes for EEG, electrodes for EMG, Electrical conductivity of electrode jellies and creams, Micro electrodes.

**BIO AMPLIFIER AND BIOMEDICAL RECORDERS**

Bioamplifier, Need for Bio amplifier, Differential amplifier, Instrumentation amplifier, Chopper amplifier, Isolation Amplifier, ECG, EEG, EMG, PCG, EOG, ERG lead system and recording methods, typical waveform.

**PATIENT MONITORING SYSTEM AND NON ELECTRICAL PARAMETERS MEASUREMENTS**

System concepts of patient monitoring system, Bedside patient monitoring system, central monitors, Blood pressure measurement, Measurement of temperature, Respiration rate measurement, cardiac output measurement, Measurement of pulse rate, Plethysmography technique.

**BLOOD FLOW METERS, BLOOD CELL COUNTERS**

Electromagnetic blood flow meter, ultrasonic blood flow meter, Laser Doppler blood flow meter, Types of blood cells, Methods of cell counting, coulter counters, automatic recognition and differential counting.

**BIO- CHEMICAL MEASUREMENTS AND BIOTELEMETRY AND PATIENT SAFETY**

Ph, Pc02, p02, Phco3 and electrophoresis, colorimeter, spectrophotometer, flame photometer, auto-analyser. Biotelemetry-wireless telemetry, single channel telemetry, multichannel telemetry, multi patient telemetry.

**TEXT BOOKS:**


1. Khandpur R.S, **"Hand-book of Biomedical Instrumentation"**, Tata McGraw Hill, 2nd Edition, 2003.
2. Leslie Cromwell, Fred Weibell J, Erich Pfeiffer. A, **"Biomedical Instrumentation and Measurements"**, Prentice-Hall India, 2nd Edition, 1997.


**REFERENCES:**


1. John G. Webster, **"Medical Instrumentation application and design"**, John Wiley, 3rd Edition, 1997.
2. Carr, Joseph J, Brown, John.M, **"Introduction to Biomedical equipment technology"**, John Wiley and sons, New York, 4th Edition, 1997.


**COURSE DESIGNERS**

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| 35321O01 | BIOSENSORS AND TRANSDUCERS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

The course is designed to make the student acquire conceptual knowledge of the transducers and biological components used for the detection of an analyte. The relation between sensor concepts and biological concepts is highlighted. The principles of biosensors that are currently deployed in the clinical side are introduced.

**PREREQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To use the basic concepts of transducers, electrodes and its classification. |
| 2 | To discuss the various types of electrodes. |
| 3 | To determine the recording of biological components. |
| 4 | To employ the knowledge in electro chemical and optical biosensors. |
| 5 | To outline the various biological components using biosensors. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| **CO1.** Describe the working principles of transducers. | Understand |
| **CO2.** Explain the various types of electrodes. | Understand |
| **CO3.** Utilize various FET sensors for recording of biological components. | Apply |
| **CO4.** Distinguish various biosensors like electro chemical and optical biosensors. | Analyze |
| **CO5.** Analyze the biological components using biosensors in various applications. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | -- | M | -- | M | -- | -- | L | -- | -- | M | -- | M | -- |
| CO2 | M | L | -- | M | -- | M | -- | -- | L | -- | -- | M | -- | M | -- |
| CO3 | S | M | L | S | -- | S | M | M | M | -- | -- | M | M | M | M |
| CO4 | S | S | L | S | -- | S | M | M | S | -- | -- | M | M | M | S |
| CO5 | S | S | L | S | -- | S | M | M | S | -- | -- | S | M | M | S |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**INTRODUCTION:** General measurement system, Transducers and its classification, Resistance transducers, capacitive transducer, Inductive transducer.

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**TRANSDUCERS:**
Temperature transducers, piezoelectric transducers, Piezo resistive transducers, photoelectric transducers.

**BIO POTENTIAL ELECTRODES:**
Half cell potential, Types of Electrodes –Micro electrodes, Depth and needle electrodes, Surface electrodes, Chemical electrodes, Catheter type electrodes, stimulation electrodes, electrode paste, electrode material.

**BIOSENSORS:**
Biological elements, Immobilization of biological components, Chemical Biosensor- ISFET, IMFET, electrochemical sensor, chemical fibro sensors.

**APPLICATIONS OF BIOSENSORS:**
Bananatrode, blood glucose sensors, non invasive blood gas monitoring, UREASE biosensor, Fermentation process control, Environmental monitoring, Medical applications.

**TEXT BOOKS:**

1. H.S. Kalsi, **"Electronic Instrumentation & Measurement"**, Tata McGraw HILL, 1995.
2. Brain R Eggins, **"Biosensors: An Introduction",** John Wiley Publication, 1997.
3. Shakthi chatterjee, **"Biomedical Instrumentation"**, Cengage Learning, 2013.
4. John G Webster, **"Medical Instrumentation: Application and design"**, John Wiley Publications, 2001.


**REFERENCES:**

1. K.Sawhney, **"A course in Electronic Measurements and Instruments"**, Dhapat Rai & sons, 1991.
2. John P Bentley, **"Principles of Measurement Systems"**, 3rd Edition, Pearson Education Asia, (2000 Indian reprint).
3. Geddes and Baker, **"Principles of Applied Biomedical Instrumentation"**, 3rd Edition, John Wiley Publications, 2008.


**COURSE DESIGNERS**

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| 4 | Mrs.S.Vaishnodevi | Assistant Professor | BME | vaishnodevi@vmkvec.edu.in |

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| 34721O02 | INTRODUCTION TO INDUSTRY 4.0 ANDINDUSTRIAL INTERNET OF THINGS | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

Industry 4.0 and Industrial Internet of Things is the pioneer of today's modern technology. To match the engineering skills with the industry skills this subject will induce and impart the knowledge among the young professionals.

**PREREQUISITE:** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | Industry 4.0 concerns the transformation of industrial processes through the integration of modern technologies such as sensors, communication, and computational processing. |
| 2 | Technologies such as Cyber Physical Systems (CPS), Internet of Things (IoT), Cloud Computing, Machine Learning, and Data Analytics are considered to be the different drivers necessary for the transformation. |
| 3 | Industrial Internet of Things (IIoT) is an application of IoT in industries to modify the various existing industrial systems. |
| 4 | IIoT links the automation system with enterprise, planning and product lifecycle. |
| 5 | Real case studies |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Apply & Analyzing the transformation of industrial process by various techniques. | Analyze |
| CO2. Evaluate the transformation technologies are considered to be the different drivers. | Apply |
| CO3. Existing industrial systems will adopt the applications of IIoT. | Apply |
| CO4. Intensive contributions over automation system with enterprise, planning and product life cycle | Analyze |
| CO5. Analyze of various Real time case studies. | Analyze |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO 1 | PO2 | PO3 | PO 4 | PO 5 | PO 6 | PO 7 | PO 8 | PO 9 | PO 10 | PO 11 | PO 12 | PSO1 | PSO 2 | PSO 3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | S | M | - | M | - | - | - | - | - | - | M | S | M | - |
| CO2 | S | S | S | M | M | - | - | - | - | - | - | M | S | M | M |
| CO3 | S | S | S | M | M | - | - | - | - | - | - | M | S | M | M |
| CO4 | S | S | S | M | M | - | - | - | - | - | - | M | S | M | M |
| CO5 | S | S | S | S | M | - | - | - | - | - | - | M | S | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**INTRODUCTION TO INDUSTRY 4.0 ANDINDUSTRIAL INTERNET OF THINGS:**

Introduction:Sensing & actuation, Communication-Part I, Part II, Networking-Part I, Part II.Industry 4.0: Globalization, The Fourth Revolution, LEAN Production Systems, Cyber Physical Systems and Next Generation Sensors, Collaborative Platform and Product Life cycle Management

**INDUSTRIAL INTERNET OF THINGS& IT'S LAYERS**

Cybersecurity in Industry 4.0, Basics of Industrial IoT: Industrial Processes-Part I, Part II, Industrial Sensing & Actuation. IIoT-Introduction, Industrial IoT: Business Model and Reference Architecture: IIoT-Business Models-Part I, Part II, IIoT Reference Architecture-Part I, Part II, Industrial IoT- Layers: IIoT Sensing-Part I, Part II, IIoT Processing-Part I, Part II.

**IIoT COMMUNICATION**

Communication-Part I, Industrial IoT- Layers: IIoT Communication, IIoT Networking-Part I, Part II, Part III. Industrial IoT: Big Data Analytics and Software Defined Networks: SDN in IIoT-Part I, Part II, Data Center Networks, Industrial IoT

**IIoT BIG DATA & SDN APPLICATIONS**

Industrial IoT: Security and Fog Computing - Fog Computing in IIoT, Security in IIoT-Part I, Part II, Industrial IoT- Application Domains. Industrial IoT- Application Domains: Healthcare, Power Plants, Inventory Management & Quality Control, Plant Safety and Security (Including AR and VR safety applications), Facility Management.

**APPLICATIONS & REAL TIME CASE STUDIES**

Industrial IoT- Application Domains: Oil, chemical and pharmaceutical industry, Applications of UAVs in Industries, Real case studies - Virtual reality lab, Manufacturing industries – part one, Manufacturing industries – part two, Milk processing and packaging industries, Steel technology lab, Student projects – part one, Student projects – part two

**TEXT BOOKS:**

1. Anandarup Misra, Sudip | Roy, Chandana | Mukherjee, "Introduction to Industrial Internet of Things and Industry 4.0, CRC press, 2003.

**REFERENCE BOOKS:**

1. Gilchrist, Alasdair, "Introduction to IoT", Apress, 2016
2. Gilchrist, Alasdair "IIoT Reference Architecture", Apress, 2016

**COURSE DESIGNERS**



| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr. L.K.Hema | Prof.&Head/ECE | ECE | hodece@avit.ac.in |
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| 34721O01 | DESIGN OF ELECTRONIC EQUIPMENT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | OE-EA | 3 | 0 | 0 | 3 |

**PREAMBLE**

The objective of this course is to sensitise a registrant to various aspects of an electronics product. Specifically on non-Electrical aspects like mechanical design and detailing. Starting from a need translated into specifications, leading to design and prototyping and ending up in a manufacture able physical prototype.

**PREREQUISITE – Nil**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To understand the various Concept of Industrial Design process. |
| 2 | To apply the basic Concept of electronic Product designs methodology. |
| 3 | To classify the Concept of Ergonomics & aesthetics in product design. |
| 4 | To understand the Knowledge regarding the design of product packaging and working environment. |
| 5 | To understand the Knowledge of different industrial standard and value analysis. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Visualize the concept for product design with respect to ergonomics and aesthetics. | Remember |
| CO2. Analyze, design and implement control panels of electronic equipments. | Apply |
| CO3. Apply creativity in the design of system by formulating architecture with proper placement of components. | Apply |
| CO4. Apply the concept of visual communication techniques in product design. | Apply |
| CO5. Apply the process of value analysis in existing product. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | M | L | - | - | S | - | - | L | M | L | - | - | S | - | - |
| CO2 | M | L | - | M | S | - | - | L | M | L | - | - | S | - | - |
| CO3 | M | L | - | M | S | - | - | L | M | L | - | L | S | - | M |
| CO4 | S | M | L | - | S | - | - | L | M | L | - | L | S | M | M |
| CO5 | S | M | L | - | S | - | - | M | L | L | - | L | S | M | M |

S- Strong; M-Medium; L-Low

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**SYLLABUS**

**MODULE 1: INTRODUCTION**

Introduction to industrial design, Role of industrial design in the domain of industry, Generic product development process, ID process, Product innovations, tools and methods.

**MODULE 2: PRODUCT PROTOTYPES**

Management of ID process, Product architecture, Structure: standard and non-standard structures. Product prototypes.

**MODULE 3: PRODUCT DESIGN AND PLANNING**

Electronic product design and development Methodology, Creativity techniques, brainstorming documentation. Product planning: Defining the task, scheduling the task and its execution. Costing and Pricing of Industrial design,

**MODULE 4: ERGONOMICS**

Ergonomics: Ergonomics of electronic equipment's, Ergonomics of control panel design. Use of ergonomics at work places and plant layout. Aesthetics: Elements of aesthetics, aesthetics of control panel design.

**MODULE 5: CASE STUDIES**

Value engineering, Product quality and design management. Industrial standards, Graphics and packaging

**TEXTBOOKS:**

1. Carl T. Ulrich, Steven. D. Eppinger," "Product Design and Development", McGraw Hill Companies.

**REFERENCE BOOKS:**

1. Ernest J Mccormick ,"Human factors in Engineering and Design" -, McGraw-Hill Co.
2. Yammiyavar P," Control Panel Design and Ergonomics", CEDT/IISc Publication.
3. Murrell K, Chapman," Ergonomics: Man in his Working Environment", &Hall. London. Flurschiem C H, "Industrial Design and Engineering Design Design", Council, London and Springer Verlag, 1983

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Mr.Rajat Kumar Dwibedi | Assistant Professor | ECE | rajatkumar.ece@avit.ac.in |
| 2 | Dr. L.K.Hema | Prof. & Head/ ECE | ECE | hodece@avit.ac.in |
| 3 | Mr.G.Murali | Assistant Professor | ECE | muralig@vmkvec.edu.in |

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| 35121R01 | PROJECT WORK | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | PI-P | 0 | 0 | 16 | 8 |

**PREAMBLE**

This course enables the students to exercise some of the knowledge and/or skills developed during the programme to new situation or problem for which there are number of engineering solutions. This course include planning of the tasks which are to be completed within the time allocated, and in turn, helps to develop ability to plan, , use, monitor and control resources optimally and economically. By studying this course abilities like creativity, imitativeness and performance qualities are also developed in students. Leadership development and supervision skills are also integrated objectives of learning this course.

**PREREQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To develop quality software solution. |
| 2 | To involve in all the stages of the software development life cycle like requirements engineering, systems analysis, systems design, software development, testing strategies and documentation. |
| 3 | To understand and gain the knowledge of the principles of software engineering practices. |
| 4 | To Get good exposure and command in one or more application areas and on the software. |
| 5 | To participate and manage a large software engineering projects in future. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| 1. Describe the Systems Development Life Cycle (SDLC). | Apply |
| 2. Design of Modules. | Apply |
| 3. Perform coding. | Apply |
| 4. Analyze and Apply various types of testing techniques and prepare documentation. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | L | S | M | - | - | S | - | S | - | M | M | M |
| CO2 | S | S | M | M | S | M | - | - | S | - | M | - | S | S | S |
| CO3 | L | M | L | L | M | M | - | - | M | - | L | - | M | M | M |
| CO4 | S | S | M | L | S | M | - | - | S | - | S | - | M | M | M |

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S- Strong; M-Medium; L-Low

- Not more than one student is permitted to work on a project.
- Each Student should be involved in each and every phase of Project Development. If it is found that student is not involved in any phase; for example coding phase, it may lead to the rejection/disqualifying of the project at any stage.
- Title of the project should be kept the same throughout the project.

**Guidelines for preparing the Project Dissertation**

This document lists the contents required for the academic project report done as part of the MCA Curriculum. Section names have been listed with description. The descriptions have been provided in italics. Important: This page and the text in italics present throughout this document are to give you guidance. Please do not include them in your project report.

**Work allocation matrix:**

Prepare work allocation matrix along with provision of follow-up remarks and notes.

**Project execution:**

Execute project preparation activities as per work allocation matrix.

**Documentation and presentation:**

Documentation of final project report which includes following in sequence.

a. Title page-(Suggested as per Annexure-II.)
b. Certificate –As per Annexure-III.
c. Index.
d. Preface/Acknowledgement.
e. Course outcomes.
f. Project title.
g. Assembly and detail production drawings.
h. List of activities (suggested as per Annexure – IV) and work allocation matrix.
i. Plant layout with dimensions.
j. List and specifications of machineries, equipments and tools.
k. Bill of material with make or buy decision.
l. Specifications of bought out parts.
m. Process sheets-As per format given in course Industrial engineering.
n. Flow process charts.
o. Specification and consumption of consumables.
p. Details of inspection / testing carried out.
q. Details of rework / rectifications carried out.

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r. Cost estimation.

s. Monitoring and control report/sheet.

t. Notes on troubleshooting.

u. Notes on individual achievement of skills / experience /problems / solutions.

v. References.

w. Day to day logbook as per Annexure-V.

x. Presentation including moments at work-video/photographs in action

**Notes:**

Prepare project report with MS Office with following guidelines.

| | |
|---|---|
| PAGE: | A4 (ON ONE SIDE). |
| MARGINN: | TOP :15mm.<br>BOTTOM :15mm.<br>RIGHT :15mm.<br>LEFT :30mm. |
| FONT: | ARIAL. |
| SIZE: | 12-BOLD, CONTENT12,<br>SPACING 18 POINTS, |
| HEADER: | TITLE OF THE PROJECT,<br>PAGE NUMBER ON TOP<br>RIGHT. |
| FOOTER: | ACADEMIC YEAR, SHORT<br>NAME OF THE INSTITUTE |

**SUGGESTED LEARNING RESOURCES.**

1. Use of Library.
2. Reference books.
3. Hand books.
4. Encyclopedia.
5. Magazines.
6. Periodicals.
7. Journals.
8. Visits of industry, organizations related as per the requirement.
9. Internet.

**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr.M.Nithya | Professor | CSE | hodcse@vmkvec.edu.in |
| 2 | Dr.S.Rajaprakash | Associate professor | CSE | rajaprakash@avit.ac.in. |

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| 35121M81 | MINI PROJECT | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | PI-M | 0 | 0 | 6 | 3 |

**PREAMBLE**

The primary emphasis of the project work is to understand and gain the knowledge of the principles of software Engineering practices, so as to participate and manage a large software engineering projects in future.

**PREREQUISITE –** Nil

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To develop quality software solution. |
| 2 | To involve in all the stages of the software development life cycle like requirements engineering, systems analysis, systems design, software development, testing strategies and documentation. |
| 3 | To understand and gain the knowledge of the principles of software engineering practices. |
| 4 | To Get good exposure and command in one or more application areas and on the software. |
| 5 | To participate and manage a large software engineering projects in future. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| 5. Describe the Systems Development Life Cycle (SDLC). | Apply |
| 6. Design of Modules. | Apply |
| 7. Perform coding. | Apply |
| 8. Analyze and Apply various types of testing techniques and prepare documentation. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | L | S | M | - | - | S | - | S | - | M | M | M |
| CO2 | S | S | M | M | S | M | - | - | S | - | M | - | S | S | S |
| CO3 | L | M | L | L | M | M | - | - | M | - | L | - | M | M | M |
| CO4 | S | S | M | L | S | M | - | - | S | - | S | - | M | M | M |

S- Strong; M-Medium; L-Low

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- Individual / not more than one student is permitted to work on a project.
- Each Student should be involved in each and every phase of Project Development. If it is found that student is not involved in any phase; for example coding phase, it may lead to the rejection/disqualifying of the project at any stage.
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**Guidelines for preparing the Project Dissertation**

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**Work allocation matrix:**

Prepare work allocation matrix along with provision of follow-up remarks and notes.

**Project execution:**

Execute project preparation activities as per work allocation matrix.

**Documentation and presentation:**

Documentation of final project report which includes following in sequence.

a. Title page-(Suggested as per Annexure-II.)
b. Certificate –As per Annexure-III.
c. Index.
d. Preface/Acknowledgement.
e. Course outcomes.
f. Project title.
g. Assembly and detail production drawings.
h. List of activities (suggested as per Annexure – IV) and work allocation matrix.
i. Plant layout with dimensions.
j. List and specifications of machineries, equipments and tools.
k. Bill of material with make or buy decision.
l. Specifications of bought out parts.
m. Process sheets-As per format given in course Industrial engineering.
n. Flow process charts.
o. Specification and consumption of consumables.
p. Details of inspection / testing carried out.
q. Details of rework / rectifications carried out.

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r. Cost estimation.

s. Monitoring and control report/sheet.

t. Notes on troubleshooting.

u. Notes on individual achievement of skills / experience /problems / solutions.

v. References.

w. Day to day logbook as per Annexure-V.

x. Presentation including moments at work-video/photographs in action

**Notes:**

Prepare project report with MS Office with following guidelines.

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| MARGINN: | TOP :15mm.<br>BOTTOM :15mm.<br>RIGHT :15mm.<br>LEFT :30mm. |
| FONT: | ARIAL. |
| SIZE: | 12-BOLD, CONTENT12,<br>SPACING 18 POINTS, |
| HEADER: | TITLE OF THE PROJECT,<br>PAGE NUMBER ON TOP<br>RIGHT. |
| FOOTER: | ACADEMIC YEAR, SHORT<br>NAME OF THE INSTITUTE |

**SUGGESTED LEARNING RESOURCES.**

10. Use of Library.
11. Reference books.
12. Hand books.
13. Encyclopedia.
14. Magazines.
15. Periodicals.
16. Journals.
17. Visits of industry, organizations related as per the requirement.
18. Internet.

**COURSE DESIGNERS**

| S.No. | Name of the Faculty | Designation | Department | Mail ID |
|---|---|---|---|---|
| 1 | Dr.M.Nithya | Professor | CSE | hodcse@vmkvec.edu.in |
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| 35121T81 | INTERNSHIP | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | PI-T | 3 WEEKS | | | 3 |

**PREAMBLE**

The Engineering Internship course is a Canvas-based course that offers students the opportunity to explore and develop their careers through professional practice. The structured plan of education impacts student work readiness through a number of professional development skill-building activities, including goal setting; analysis and reflection; feedback from employer; informational interviewing and debriefing their experience.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| **1.** | An understanding of how liberal arts coursework ties to professional careers of interest. |
| **2.** | Gain insight into a possible career path of interest while learning about the industry in which the organization resides, organizational structure, and roles and responsibilities within that structure. |
| **3.** | Develop professional connections and identify a strategy for maintaining those connections |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1. Add details about your experience including new skills developed and results obtained . | Understand |
| CO2. Analyze your internship experience, reflecting on lessons learned and how your liberal arts education prepared you for the internship. | Apply |
| CO3. Identification of additional skills that will need to be developed to ensure career readiness. | Apply |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | S | L | S | - | L | L | S | L | S | - | M | M | M |
| CO2 | S | S | M | M | S | M | L | L | M | M | M | - | S | S | S |
| CO3 | L | M | M | L | M | M | L | L | M | L | L | - | M | M | M |

S- Strong; M-Medium; L-Low

**General Procedure**

***Final Reflection Report:***

**I. General Information Section**

Explain your role and how your work contributed to the company

**II. Technical Skills**

Document the technical experiences you had during your work experience and discuss technical problems that you assisted in solving

**III. Development of Professional Skills**

Describe team and leadership building opportunities on the job

**IV. Assessments**

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- Discuss whether or not you met goals set out by your supervisor or that you set for yourself
- Evaluate your performance of assigned projects, noting both areas of strength and improvement

**V. <u>Conclusion</u>**

- Summarize by addressing the impact of the work experience on your education and career goals
- Provide two "lessons learned" to share with any student that is considering an internship

**COURSE DESIGNERS**

| S.No | Name of the Faculty | Designation | Name of the College | Mail ID |
|---|---|---|---|---|
| 1. | Dr.M.Nithya | Professor | CSE/VMKVEC | hodcse@vmkvec.edu.in |
| 2. | Dr.S.Rajaprakash | Associate professor | CSE/AVIT | rajaprakash@avit.ac.in. |

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| 34121Z82 | GENDER EQUITY ANDLAW<br>(COMMON TO ALL BRANCHES) | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | AC | 2 | 0 | 0 | 0 |

Gender Equity is the provision of fairness and justice in the distribution of benefits and responsibilities between,Men, Women, Transgender, and Gender non-binary individuals. Gender equity is important because, historically, societies around the world have deemed females, transgender people, and nonbinary people as"weaker" or less important than males.Gender equity emphasizes respecting individuals without discrimination, regardless of their gender. There are legal provisions thataddress issues like inequalities that limit a person's ability to access opportunities to achieve better health, education, and economic opportunity based on their
gender.

**PREREQUISITE: NIL**

**COURSE OBJECTIVES**

| | |
|---|---|
| 1 | To sensitize the students regarding the issues of gender and the gender inequalities prevalent in society. |
| 2 | To raise and develop social consciousness about gender equity among the students. |
| 3 | To build a dialogue and bring a fresh perspective on transgender and gender non-conforming individuals. |
| 4 | To create awareness among the students and to help them face gender stereotype issues. |
| 5 | To help the students understand the various legal provisions that are available in our society. |

**COURSE OUTCOMES**

On the successful completion of the course, students will be able to

| | |
|---|---|
| CO1.Understand the importance of gender equity | Understand |
| CO2.Initiate the awareness and recognize the social responsibility with regards to gender equity. | Apply |
| CO3.To develop a sense of inclusiveness and tolerance towards various genders without any discrimination. | Apply |
| CO4. To evaluate the social issues and apply suitable gender-related regulations for inclusive living. | Evaluate |
| CO5.To identify and analyze the existing gender inequality problems faced in various institutions. | Analyse |

**MAPPING WITH PROGRAMME OUTCOMES AND PROGRAMME SPECIFIC OUTCOMES**

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| COS | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PSO1 | PSO2 | PSO3 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO1 | S | M | L | - | - | S | S | S | - | - | - | S | - | - | - |
| CO2 | S | M | M | - | - | S | S | S | - | - | - | S | - | - | - |
| CO3 | S | L | M | - | - | S | S | S | - | - | - | S | - | - | - |
| CO4 | S | S | S | L | - | S | S | S | - | - | - | S | - | - | - |
| CO5 | S | S | S | M | - | S | S | S | - | - | - | S | - | - | - |

S- Strong; M-Medium; L-Low

**SYLLABUS**

**UNIT –I INTRODUCTION TO GENDER AND SEX 6hrs**

Definition of Sex – Definition of Gender - Sex Vs. Gender - Social Construction of Gender and Gender Roles – GenderStereotypes - Gender Division of Labour - Patriarchy, Masculinity and Gender Equality - Feminism and Patriarchy.

**UNIT –II - GENDER BIAS 6hrs**

Introduction to Gender Inequality in India - Gender Bias in Media - Misleading Advertisement And Poor Portrayal of Women and gender non-conforming individuals- Objectification of Women, Transgender, and gender non-conforming individuals - Differential Treatment of Women, Transgender, Exploitation Caused by Gender Ideology - Female Infanticide - Honor Killing.

**UNIT –III GENDER SENSITIZATION AND INTERNATIONAL CONVENTIONS 6hrs**

**Gender Sensitization** -Need and Objective - Gender Sensitivity Training at Workplace – GenderSensitization inJudiciary - Gender Sensitization in School Curriculum.

**UNIT-IV - SEXUAL OFFENCES AGAINST WOMEN 6 hrs**

Indian Penal Code, 1860 - S., 304B, 354, 354C, 354d, 376, 498A & 509 - The ImmoralTrafficPrevention Act 1986 - The Sexual Harassment of Women at Workplace (Prevention,Prohibition and Redressal) Act, 2013 - Protection of Women from Domestic Violence Act, 2005- Indecent Representation of Women Act, 1986**.**

**UNIT-V ROLE OF GOVERNMENT FOR INCLUSIVE DEVELOPMENT 6hrs**

Initiatives of NCERT -Role of Ministry of Women and Child Development - Governmental Initiatives: Beti BachaoBeti Padhao (BBBP) - Ujjawala Scheme - Working Women Hostels (WWH), National Council for Transgender Persons.

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**TEXT BOOKS**

1. IGNOU: Gender Sensitization: Society, Culture and Change (2019) BGSE001, New Delhi IGNOU
2. Jane Pilcher and Imelda Whelehan (2005): Fifty Key Concepts in Gender Studies

**REFERENCES:**

1. Women's Empowerment & Gender Parity: @Gender Sensitization, Dr. Shikha Bhatnagar, Repro Books(2020).

2. Gender Sensitization: Issues and Challenges, Anupama Sihag Raj Pal Singh, Raj Publications (2019).

3. Violence Against Women: Current Theory and Practice in Domestic Abuse, Sexual Violence, andExploitation(Research Highlights in Social Work), Jessica Kingsley Publishers (2012).

4. Gill, Rajesh, Contemporary Indian Urban Society- Ethnicity, Gender and Governance, BookwellPublishers,New Delhi (2009).

5. Sexual Violence Against Women: Penal Law and Human Rights Perspectives, Lexis Nexis (2009) 6. Chatterjee, Mohini, Feminism and Gender Equality, Aavishkar, Jaipur,2005.

7. Mies, Maria, Indian Women and Patriarchy, Concept Publishing Company, New Delhi, 2004.

**COURSE DESIGNERS**


| S.No. | Name of the Faculty | Mail ID |
|---|---|---|
| 1. | Gnana Sanga Mithra.S | sangamithra@avil.edu.in |
| 2 | Aarthy.G | aarthy@avil.edu.in |


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## 34121Z81 - YOGA AND MEDITATION

Course Objective: To gain knowledge about the Yogic Practices **CourseOutcomes:**

Students should be able to

- Evaluate the importance of preparatory exercise.
- Demonstrate the suryanamaskar and various asanas.
- Utilize the meditation techniques.
- Compare mudras and bandhas
- Assess the difference between the asanas and physical exercises.

**UNIT - I**

History of Yoga - Definition and Meaning of the term Yoga - Comprehensive Natureand Scope of Yoga- Aims and Objectives of Yoga

Text books:

1. H R.Nagarathnam & Dr.H R Nagendra (2015) Promotion of positive health swamivivekanandha yoga prakashana, Banglore.
2. The Classic Guide to Yoga, Dr.G.S.Thangapandiyan, Sports Publication, New Delhi(2020).

**UNIT – II**

Stream of Yoga: Karma yoga- Raja yoga- Jnana Yoga - Bhakti yoga - Differencebetween practice of Asanas and Physical Exercise.

**Text books:**

1. Light on Yoga, B.K.S Iyengar Harpine Collins Publication, New Delhi, 2000.
2. Sound Health Through Yoga, K.Chandrasekaran, Prem Kalyan Publications,Sedapatti, 1999.

**UNIT – III**

Asanas Practice: - Suryanamaskar - Meditative Asanas: Sukhasana – Ardha Padmasana – Padmasana – Vajrasana – Standing Asanas: Tadasana –Trikonasana- Parivrtta Trikonasana – Vrikshasana –Sitting Asanas: Baddha konasana – Janusirasana – Paschimottanasana – Ustrasana – Vakrasana – Gomukhasana.

**Text books:**

1. H R.Nagarathnam & Dr.H R Nagendra (2015) Promotion of positive health swamivivekanandha yoga prakashana, Banglore.
2. The Classic Guide to Yoga, Dr.G.S.Thangapandiyan, Sports Publication, New Delhi(2020).

**UNIT: IV**

Asanas Practice: Prone Asanas: Makarasana – Bhujangasana – Sasangasana- Shalabhasana – Dhanurasana - Supine Asanas: Pavanamuktasana – Artha Halasana - Sethubandasana – Navasana –Savasana.

**Text books:**

1. H R.Nagarathnam & Dr.H R Nagendra (2015) Promotion of positive health swamivivekanandha yoga prakashana, Banglore.

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2. The Classic Guide to Yoga, Dr.G.S.Thangapandiyan, Sports Publication, New Delhi(2020).

**UNIT- V**

Pranayama Practice: Sectional Breathing - Nadisuddhi – Bhramari – Bhastrika -Kapalabhati – Introduction to Bandhas – Mudras – Dharana (Trataka) – Dhyana.

**Text books:**

1. Swami Satyananda Saraswati, (2008): Asana Pranayama Mudra, Bandha (IV Revised Edition): Bihar School of Yoga, Munger, India.

**Reference books:**

1. Asanas, Swami Kuvalayananda, Kaivalayadhama, Lonavla, 1993.
2. Yoga for All, Maharishi Patanjali, Sahni Publications, 2003.
3. Yoga for Health, Institute of Naturopathy & Yogic Sciences, Bangalore, 2003.
4. Yoga for Health, K.Chandara Shekar, Khel Sahitya Kendra, Theni, 2003.
5. Yoga for the Morden Man, M.P.Pandit, Sterling Publishers Private Limited, NewDelhi, 1987.
6. Yoga for You, Indira Devi, Jaico Publishing House, Chennai,

2002.

**Web Resources**

1. https://kdham.com/
2. http://www.biharyoga.net/

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| 34121Z83 | ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | AC | 1 | 0 | 0 | 0 |

**Course Objectives :**

1. To facilitate the students with the concepts of Indian traditional knowledge and to make them understand the Importance of roots of knowledge system.
2. To make the students understand the traditional knowledge and analyse it and apply it to their day to day life

**Course Outcomes :**

At the end of the Course, Student will be able to:

1. Identify the concept of Traditional knowledge and its importance.
2. Explain the need and importance of protecting traditional knowledge.
3. Illustrate the various enactments related to the protection of traditional knowledge.
4. Interpret the concepts of Intellectual property to protect the traditional knowledge.
5. Explain the importance of Traditional knowledge in Agriculture and Medicine.

UNIT-I:

**Introduction to traditional knowledge:** Define traditional knowledge, nature and characteristics, scope and importance, kinds of traditional knowledge, Indigenous Knowledge (IK), characteristics, traditional knowledge vis-a-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge

UNIT-2:

**Protection of traditional knowledge:**The need for protecting traditional knowledge Significance of TK Protection, value of TK in global economy, Role of Government to harness TK.

UNIT-3:

**Legal framework and TK:** The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004, the protection of traditional knowledge bill, 2016.

UNIT-4:

**Traditional knowledge and intellectual property:** Systems of traditional knowledge protection, Legal concepts for the protection of traditional knowledge, Patents and traditional knowledge, Strategies to increase protection of traditional knowledge

UNIT-5:

**Traditional Knowledge in Different Sectors:** Traditional knowledge and engineering, Traditional medicine system, TK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of TK

**Text Books:**

1. Traditional Knowledge System in India, by Amit Jha, 2009.

Reference Books:

1. Traditional Knowledge System in India by Amit Jha Atlantic publishers, 2002.

2. "Knowledge Traditions and Practices of India" Kapil Kapoor1, Michel Danino2.

**Web Links:**

1.https://www.youtube.com/watch?v=LZP1StpYEPM

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| 34121Z84 | INDIAN CONSTITUTION | Category | L | T | P | Credit |
|---|---|---|---|---|---|---|
| | | AC | 1 | 0 | 0 | 0 |

**Course Objectives:**

On completion of this course, the students will be able:

1 To understand the nature and the Philosophy of the Constitution.

2 To understand the outstanding Features of the Indian Constitution and Nature of the Federal system.

3 To Analyse Panchayat Raj institutions as a tool of decentralization.

4 To Understand and analyse the three wings of the state in the contemporary scenario.

5 To Analyse Role of Adjudicatory Process.

5 To Understand and Evaluate the recent trends in the Indian Judiciary.

**Course Content**

**The Constitution - Introduction**

The Historical background and making of the Indian Constitution –Features of the Indian Constitution- Preamble and the Basic Structure - Fundamental Rights and Fundamental Duties – Directive Principles State Policy

**Government of the Union**

The Union Executive- Powers and duties of President –Prime Minister and Council of Ministers - Lok Sabha and Rajya Sabha

**Government of the States**

The Governor –Role and Powers - Cheif Minister and Council of Ministers- State Legislature

**Local Government**

The New system of Panchayats ,Municipalities and Co-Operative Societies

**Elections**

Powers of Legislature -Role of Chief Election Commissioner-State Election Commission

**TEXTBOOKS AND REFERENCE BOOKS:**

1 Ethics and Politics of the Indian Constitution Rajeev Bhargava Oxford University Press, New Delhi, 2008

2 The Constitution of India B.L. Fadia Sahitya Bhawan; New edition (2017)

3 Introduction to the Constitution of India DD Basu Lexis Nexis; Twenty-Fourth 2020 edition

Suggested.

**Total Hours: 30 hours**

**Software/Learning Websites:**

1. https://www.constitution.org/cons/india/const.html
2. http://www.legislative.gov.in/constitution-of-india
3. https://www.sci.gov.in/constitution
4. https://www.toppr.com/guides/civics/the-indian-constitution/the-constitution-of india/

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**Alternative NPTEL/SWAYAM Course:**

| S.NO | NPTEL ID | NPTEL Course Title | Course Instructor |
|---|---|---|---|
| **1** | 12910600 | CONSTITUTION OF INDIA AND ENVIRONMENTAL GOVERNANCE: ADMINISTRATIVE AND ADJUDICATORY PROCESS | PROF. M. K. RAMESH NATIONAL LAW SCHOOL OF INDIA UNIVERSITY |

| **COURSE DESIGNER** | | | | |
|---|---|---|---|---|
| **S.NO** | **NAME OF THE FACULTY** | **DESIGNATION** | **NAME OF THE INSTITUTION** | **MAIL ID** |
| 1 | Dr.Sudheer | Principal | AV School of Law | Sudheersurya18@gmail.com |

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