

EIGHTH SEMESTER

THEORY

S.No	Subject Code	Subject Name	L	T	P	IA	EE	Total
1		Total Quality Management	4	0	0	20	80	100
2		Elective III	4	0	0	20	80	100

PRACTICAL

S.No	Subject Code	Subject Name	L	T	P	IA	EE	Total
7		Project	0	0	3	20	80	100

SEMESTER VIII

1. TOTAL QUALITY MANAGEMENT

1. INTRODUCTION

9

Definition of Quality, Dimensions of Quality, Quality Planning, Quality costs – Analysis Techniques for Quality Costs, Basic concepts of Total Quality Management, Historical Review, Principles of TQM, Leadership – Concepts, Role of Senior Management, Quality Council, Quality Statements, Strategic Planning, Deming Philosophy, Barriers to TQM Implementation.

2. TQM PRINCIPLES

9

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Employee Involvement – Motivation, Empowerment, Teams, Recognition and Reward, Performance Appraisal, Benefits, Continuous Process Improvement – Juran Trilogy, PDCA Cycle, 5S, Kaizen, Supplier Partnership – Partnering, sourcing, Supplier Selection, Supplier Rating, Relationship Development, Performance Measures – Basic Concepts, Strategy, Performance Measure.

3. STATISTICAL PROCESS CONTROL (SPC)

9

The seven tools of quality, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Process capability, Concept of six sigma, New seven Management tools.

4. TQM TOOLS

9

Benchmarking – Reasons to Benchmark, Benchmarking Process, Quality Function Deployment (QFD) – House of Quality, QFD Process, Benefits, Taguchi Quality Loss Function, Total Productive Maintenance (TPM) – Concept, Improvement Needs, FMEA – Stages of FMEA.

5. QUALITY SYSTEMS

9

Need for ISO 9000 and Other Quality Systems, ISO 9000:2000 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, QS 9000, ISO 14000 – Concept, Requirements and Benefits.

Total Hours: 45

TEXT BOOK:

1. Dale H. Besterfield, et al., Total Quality Management, Pearson Education Asia, 1999. (Indian reprint 2002).

REFERENCES:

1. James R. Evans & William M. Lindsay, The Management and Control of Quality, (5th Edition), South Western (Thomson Learning), 2002 (ISBN 0-324-06680-5).
2. Feigenbaum, A.V. "Total Quality Management, McGraw-Hill, 1991.
3. Oakland, J.S. "Total Quality Management Butterworth – Heinemann Ltd., Oxford 1989.
4. Narayana V. and Sreenivasan, N.S. Quality Management – Concepts and Tasks, New Age International 1996.
5. Zeiri. "Total Quality Management for Engineers Wood Head Publishers, 1991.

SEMESTER VIII - ELECTIVE

1 ANALOG AND DIGITAL COMMUNICATION

1. MODULATION SYSTEMS

9

AM – Frequency Translation – single sideband and double sideband modulation, vestigial sideband modulation. FM phase and frequency modulation, FM spectral analysis, FM bandwidth, AM Modulators and FM modulators, AM Transmitters and FM Transmitters.

2. RECEIVERS

9

Sensitivity, Selectivity, AM receivers, FM receivers, Noise in AM & FM systems, SNR in AM Receivers, signal to noise power in FM, Pre-emphasis and deemphasis.

3. ANALOG TO DIGITAL CONVERSION 9

Sampling theorem, pulse amplitude modulation(PAM), pulse width modulation(PWM), pulse position modulation(PPM), pulse code modulation(PCM). Digital modulation and demodulation system. ASK, FSK, PSK.

4. INFORMATION THEORY 9

Average information, Information rate, Shannon's theorem, channel capacity, bandwidth, S/N trade off.

5. SATELLITE ACCESS 9

Modulation and multiplexing voice, data, video; Analog-Digital transmission system, Digital video broadcast, multiple access: FDMA, TDMA, CDMA, assignment methods, spread spectrum Communication, compression, encryption.

Total Hours: 45

TEXT BOOK

1. Taub & Schilling, "Principles of Communication systems", McGraw-Hill, 1986.

REFERENCES

1. Wayne Tomasi, "Electronic communication systems", fundamentals through advanced, LPE, Pearson Education, Fourth Reprint, 2001.

SEMESTER VIII - ELECTIVE

2. BIO FLUID AND DYNAMICS

1. INTRODUCTORY CONCEPTS 9

Fluids and non-fluids, continuum coordinate systems, force and moments, stress at a point, rate of strain, properties of fluids, classification of fluids.

2. FLUID FLOW 9

Different types of fluid flows, laminar and turbulent flow, transition from laminar to turbulent flow, laminar flow-annulus, laminar flow between parallel plates, measurement of viscosity.

3. BOUNDARY LAYER FLOW 9

Development of boundary layer, estimates of boundary layer thickness, boundary layer equation, nature of turbulence, smooth and rough surface, boundary layer separation.

4. PRESSURE AND FLOW IN BLOOD VESSELS 9

Friction loss in flow in a tube, velocity distribution of aortic system, waveform of pressure and velocity in aorta, wave reflections and impedance in arterial segments, blood flow in veins and blood flow in capillaries.

5. ANALYSIS OF CARDIO VASCULAR DYNAMICS

9

Control theory and system analysis, mechanical analysis of circulatory systems, basic concept of myocardial mechanics, index of contractibility, fluid dynamics of aortic and mitral valves.

Total Hours: 45

TEXT BOOKS

1. **K.L.Kumar, “Engineering fluid mechanics”, Eurasia Publishing House (P) Ltd.,New Delhi, 1998.**
2. **D.H.Bergel, “Cardiovascular fluid dynamics”- Vol. I, Academic press, London &New York, 1972.**

SEMESTER VIII - ELECTIVE

3. ASSIST DEVICES

1. CARDIAC ASSIST DEVICES 9

Principle of External counter pulsation techniques, intra aortic balloon pump, Auxiliary ventricle and schematic for temporary bypass of left ventricle, prosthetic heart valves.

2. HEMODIALYSERS 9

Artificial kidney, Dialysis action, hemodialyser unit, membrane dialysis, portable dialyser monitoring and functional parameters.

3. HEARING AIDS 9

Common tests – audiograms, airconduction, boneconduction, masking techniques, SISI, Hearing aids – principles, drawbacks in the conventional unit, DSP based hearing aids.

4. PROSTHETIC AND ORTHODIC DEVICES

9

Hand and arm replacement – different types of models, externally powered limb prosthesis, feedback in orthodic system, functional electrical stimulation, sensory assist devices.

5. RECENT TRENDS

9

Transcutaneous electrical nerve stimulator, bio-feedback.

Total Hours: 45

TEXT BOOKS

1. Levine S.N. (ed), “Advances in Bio-medical engineering and Medical physics”, Vol. I, II, IV, inter university publications, New York, 1968 (Unit I, IV, V).
2. Kolff W.J, “Artificial Organs”, Johnwiley and sons, New York, 1976. (Unit II).
3. Albert M.Cook and Webster J.G, “Therapeutic Medical Devices”, Prentice Hall Inc., New Jersey, 1982 (Unit III).

SEMESTER VIII - ELECTIVE

4. BIO MECHANICS

1. BIOFLUID MECHANICS 9
Newtons laws, stress, strain elasticity, Hooke's-law, viscosity, Newtonian fluid, Non-Newtonian fluid, Viscoelastic fluids, Vascular tree. Relationship between diameter, velocity and pressure of blood flow, resistance against flow.
2. CARDIAC MECHANICS 9
Cardio vascular system, Mechanical properties of blood vessels – arteries, arterioles, capillaries, veins, blood flow: laminar and turbulent, physics of cardio vascular diseases, prosthetic heart valves and replacement.
3. RESPIRATORY MECHANICS 9
Alveoli mechanics, interaction of blood and lung, P-V curve of lung, breathing mechanism, airway resistance, physics of lung diseases.
4. SOFT TISSUE MECHANICS 9
Pseudo elasticity, nonlinear stress-strain relationship, viscoelasticity, structure, function and mechanical properties of skin, ligaments and tendons.
5. ORTHOPAEDIC MECHANICS 9
Mechanical properties of cartilage, diffusion properties of articular cartilage, mechanical properties of bone, kinetics and kinematics of joints, lubrication of joints analysis of force in orthopaedic implants.

Total Hours: 45

REFERENCES:

1. Y.C.Fung, "Biomechanics: Mechanical properties of living tissues", Springer, verlag, New York, 1981.
2. D.Dawson & Right, "Introduction to bio-mechanics of joints and joint replacement", Mechanical Engineering Publication Ltd, 1989.
3. Jacob Kline, "Handbook of biomedical engineering", Academic press Inc., San Diego, 1