

SAURASHTRA UNIVERSITY , RAJKOT
TEACHING AND EXAMINATION SCHEME FOR
B.E. SEM VI (Electronics & Communication Engg.)

Code No.	Subject	Teaching		Examination Scheme				
		Lect.	Prac.	Theory	Paper Hrs.	Prac./Oral	Term Work	Total
601	Comm. Theory & Techniques.	4	2	100	3	50	25	175
602	Video Engineering	4	2	100	3	50	25	175
603	Industrial& production Management	4	-	100	3	-	-	100
604	Optical & Satellite Communication	4	2	100	3	50	25	175
605	Microwave & radiation techniques	4	2	100	3	50	25	175
606	Seminar	-	2	-	-	25	25	50
	Total	20	10	500	-	225	125	850

SAURASHTRA UNIVERSITY, RAJKOT
B.E.SEMESTER-VI (E.C.)
(601) : Communication Theory & Techniques.

THEORY SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
04	02	100	03	50	25	175

1. Introduction :

Communication system, Analog & Digital Messages, SNR, Channel Band width & rate of communication, Randomness, Redundancy, Coding.

2. Spectral Analysis of Signals:

Size of a signal, classification of signal, signal operations, signals & vectors, correlation, orthogonality of signal, Trigonometric Fourier series, Exponential Fourier series.

3. Analysis & Transmission of Signals :

Aperiodic signal representation by Fourier integral, Transforms functions, properties of Fourier transform, signal transmission through a linear system, Ideal & practical filters, signal distortion over a communication channel, signal energy and energy spectral density, signal power & power spectral density.

4. Linear & Exponential Modulation System:

Amplitude modulation, DSB, QAM, SSB, VSB, concept of instantaneous frequency , Bandwidth of angle modulated wave.., Interference in amplitude & angle modulated system.

5. Random Variables and Processes:

Introduction to probability & set theory, conditional and joint probability, statistical Independence, Baye's theorem, Random variables ; Discrete and Continuous, Joint distributions, characteristics of Random variables.

Standard PDF.(Probability Distribution Functions) :

Gaussian, Rayleigh, Uniform, Center limit theorem;

- Properties Illustration, Applications.

Random processes.

6. Information Theory :

Discrete messages, concept of amount of information, Entropy, Information rate, different types of channels & channel capacity , Shannon's Theorem, capacity of a Gaussian channel, Bandwidth –S/N tradoff.

7. Coding Techniques :

Introduction, coding efficiency,

Block code, convolution code, cyclic code, Automatic repeat request (ARQ)

Shannon – fano coding, Huffman coding.

Reference Books :

- 1) Modern digital & analog communication system.-**B.P. Lathi** (Oxford Uni.Press)
- 2) Principles of Communication systems. - **Taub & Shalling** (TMH)
- 3) Communication systems Analog and Digital – **Singh & Sapre** (TMH)
- 4) Communication system Engineering - **Proakis & Salehi** (Pearson education)

SAURASHTRA UNIVERSITY, RAJKOT
B.E.SEMESTER-VI (E.C.)
(602) : VIDEO ENGINEERING

THEORY SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
04	02	100	03	50	25	175

1. Introduction :

Picture transmission, Television transmitter, Television Receiver, Synchronization, Receiver Controls, Geometric form and Aspect ratio, Image continuity, Number of Scanning Lines, Interlaced Scanning, Picture Resolution, Brightness Gradation and Colour Characteristics.

2. Television Cameras and Picture Tubes :

Camera tube types, Vidicon Camera tube, Silicon diode array vidicon, Electrostatic focusing, Beam deflection, Picture tube screen, Raster centering Adjustments, Picture tube chara. and control, Colour Picture tubes.

3. Composite Video Signal :

Video Signal dimensions, Horizontal Sync. Composition, Vertical Sync. Details, Functions of vertical pulse train, Scanning sequence Details.

4. Colour Signal Generation & Transmission :

Perception of Brightness & Colours, Additive Colour Mixing, Video signals for colours, Luminance signal(Y), Compatibility, Colour – Difference signals, Encoding of colour- Difference signals, Formation of Chrominance signals, Picture signal transmission, Positive & Negative Modulation, Vestigial sideband transmission, Sound Signal transmission, Standard Channel Bandwidth, TV Transmitter, Interference suffered by TV signals, TV Broadcast Channels, TV transmission and reception antennas.

5. Television Systems and Standards :

American S2S line B & W TV system, NTSC Colour System , 625 line Monochrome system, French B & W and Colour TV systems, TV Standards.

6. Monochrome TV Receiver :

Input from Antenna, RF Tuner, IF subsystem, Video Amplifier, Sound Section, Sync. Separation & Processing, Deflection Circuits, Scanning current in the Yoke, DC power supplies, summary of functions of Receiver Stages.

7. PAL- D Colour Receiver :

Electronic Tuners, IF subsystem, Y signal Channel, Chroma Decoder, Separation of U and V colour Phasors, Synchronous Demodulators, Subcarrier Generation & Control, Matrixing of Drive Circuits. Raster circuits, Summary of Receiver operation.

8. Study of Different Subsystems :

Vision IF Section, AGC, FM Detection, FM sound Detectors, Sound Channel IF CA 1190, Typical Application circuit of CA 1190, Intro to Video Amplifier & Requirements, Contrast & Brightness Control Method, Luminance Channel, PAL-D decoder, Colour burst separator, ACC amplifier, Ident and Colour killer ckts., PAL colour decoder IC TDA 3561A,.Functions of various stages and faults location in various stages, Sync. Separation, AFC, Deflection drive IC 920, Requirements of vertical Reflection circuits, Vertical deflection IC- TDA 1170 S, Line Drive Stage, Line output stage, Basic power supply circuits, SMPS, Typical flyback SMPS Circuit, EHT Generation.

9. Video-Tape Recording & Playback :

Video Recording Problems, Video Tape recording, Video Cassette Recorder (V.C.R.) Types, VCR Input-Output Connections, Operation and Control of Modern VCRs, Video Disc Recording & Playback.

10. Television Technology :

MATV, CCTV, CATV, 3-D TV pictures, HDTV, Flat Panel Display TV Receivers, Colour Receivers of New Generation.

Reference Books :-

1. Modern TV Practice – **R.R. Gulati** – (Wiley Eastern Limited)
2. Monochrome and color TV – **R.R. Gulati** – (New Age Pub)
3. Colour Television – **R.R. Gulati** – (New Age Pub)
4. Television Engg. - **A.M Dhake** (IMH).
5. Basic Television and Video System --- **Grob**.

SAURASHTRA UNIVERSITY, RAJKOT
B.E.SEMESTER-VI (E.C.)
(603) SUBJECT: Industrial and production Management

THEORY SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
04	-	100	03	-	-	100

1. ORGANISATION

Concept; Organisation structure; Types of organization; Delegation of authority; Group Dynamics; Organisation conflict; Different Industrial Ownership.

2. MANAGEMENT CONCEPT

Fundamentals of management; its principles; Management thought; Management by Objectives (Mbo); Theories of Decision Making; Functions of management in industry; Scientific management; project management; Management Information System; Total Quality Management (TQM); concept of supply chain management.

3. PERSONAL MANAGEMENT

Managerial skill; duties and responsibilities; Leadership styles; Staffing policies & process; Job Envaluation & Merit rating; Labour selection ; training & promotion; wage plan & incentive schemes; Introduction to industrial legislation.

4. PRODUCTION MANAGEMENT

Concept of production system, plant location, layout process layout, process planning; Group technology; production planning & Quality control; Material procurement and Inventory Control; Concept of economic order quality.

Modern manufacturing techniques in electronics industry; Introduction to NC, CNC, DNC and machining center; Non-conventional machining processes- EDM, ECM, Plasma Arc cutting etc.

Product development methods; Use of Quantitative Techniques- Work study, Method study, Time & Motion study, therbligs; Introduction to Organisation research, PERT & CPM; Introduction to ISO 9000 series standards; Introduction to patenting & Law of copyright

REFERENCE Books:-

1. O.P. Khanna : Industrial Engineering & Management; 2nd Edition; Dhanpat Rai Publication Pvt. Ltd. New Delhi 1999.
2. R.D. Agarwal : Organisation & Management; 8th Edition; Tata Mc-Graw Hill Publications Pvt. Ltd. Delhi 2002.
3. S.P. Robbins: Fundamentals of Management; 3rd Edition; Pearson Education Pvt. Ltd. Delhi 2001.
4. R.S. Davar: Personal Management & Relations; 2nd Edition; Vikas Publishing House Pvt. Ltd. Mumbai 1995.
5. J.C. Allen: Starting a Technology Business; Pitman Professional Publishing, London; 1992.
6. M.P. Groover: Automation, Production Systems & Computer Integrated Manufacturing; 2nd Edition; Prentice Hall India Pvt. Ltd. New Delhi 2002.
7. R.K. Jain: Production Technology; 16th Edition Khanna Publishers, New Delhi 2002.

SAURASHTRA UNIVERSITY, RAJKOT
B.E.SEMESTER-VI (E.C.)
(604) : Optical and Satellite Communication

THEORY SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
04	02	100	03	50	25	175

Optical Communication

1. Introduction and Optical fFibre Wave Guides :

General communication system versus, Optical fibre communication system, Advantages of optical fibre communication, Ray theory transmission and related terms, Requirement of Cladding, Skew rays and related terms, Phase velocity & group velocity, Simple introduction of modes in planner optical wave guide, Single mode fibres, major reasons for wide use in telecommunication(PP-59)

2. Transmission Characteristic of Optical Fibre :

Introduction, Attenuation, Losses in fibres, Material Absorption losses, Linear and Non-linear losses, Fibre bend loss, Dispersion loss.

3. Optical Fibre & Cables :

Introduction : Requirements of an O. F. used for telecommunication, Preparation of optical fibre, Liquid phase and vapour phase deposition techniques, Fluoride glass fibre, Types of optical fibres: Structure & characteristics, Optical fibre cables- construction.

4. Optical Fibre Connection :

Introduction, Fibre alignment & joint losses, Fibre splices, their types, Fibre connectors, their requirements and simple general treatment. Fibre couplers, three & four port couplers.

5. Optical Sources: LASER & LED :

Introduction, Requirements of Optical sources, Basic principle of operation of LASER & LED, (Optical emission) semiconductor materials in (PP-313), Semiconductor injection laser, Injection laser to fibre coupling, LED as optical - source, advantages, LED power and efficiency, LED structures, edge emitter and super luminescent LEDs, LED characteristics.

6. Optical Detection :

Introduction, Requirement of an optical detector, Detection principle, Semiconductor photo diode, p-I-n photo diode: construction and working, Avalanche photo diodes, Mid infrared photo diode, photo transistor, Photo conductive detector.

7. Optical Communication System :

Optical transmitter circuit, Source limitations, Analog & digital optical receiver circuits: Block diagram (General Circuit) and working.

8. Applications and Future Developments :

Public N/W application, submerged systems, Military, civil, consumer industrial and computer applications.

Satellite Communication.

1. Introduction :

Geostationary, polar and elliptical orbits , calculation of height of geostationary satellite , Doppler shift , attitude control and station keeping.

2. Satellite links :

Various link parameters , (G/T), EIRP, saturation flux density ,(C/N) ratio, link calculations for analog and digital systems.

3. Satellite sub systems :

attitude control , reaction control , power , telemetry, telecommand and ranging satellite antennas , transponders . Frequency reuse in satellites . apogee motor, Various stages in a satellite launch.

4. Satellite earth station :

Antennas and feed system. Satellite tracking. Transmitter and receiver sub-systems.

5. Multiple access techniques

FDMA.TDMA.SSMA. their basic principles. Relative advantages and disadvantages. Applications,

6. VSAT networks :

Their basic principals and applications.

Reference books :

1. Optical Fiber Communication - **Jhon M Senior** (PHI)
2. Optical Fiber Communication - **Gerd Keiser** (MC Graw Hill)
3. Optical Communication System - **Jhon Gowar**.
4. Fiber optics in Telecommunication - **N.Sharma**
5. An Introduction to optical fibre - **Allem H. Cherin**.
6. Digital satellite communication II edition - **Tri.T.Ha** (TaTa Mc Graw Hill)
7. Digital communication by satellites: **J.J. Spilker**
8. Digital comm.. with special emphasis to satellite earth station engg.- **Feher**
9. Communication satellites: **J. martin**.

SAURASHTRA UNIVERSITY, RAJKOT
B.E.SEMESTER-VI (E.C.)
(605) : Microwave and Radiation Techniques

THEORY SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
04	02	100	03	50	25	175

1. Introduction to various types of transmission lines at microwave frequencies, Wave guides, Coaxial line, Strip line and micro strip transmission line.
2. Waveguides, their propagation characteristics, Concept of phase and group velocity, TE and TM waves.
3. Stripline and microstrip line, Characteristic impedance, losses, quality factor, higher order modes, Realisation of microstrip lines.
4. Microwave tubes Limitation of Conventional tube at UHF Review of Microwave tubes two cavity & multi cavity klystrons, Reflex klystron, TWT and Magnetron working performance & application of tubes.
5. **Microwave Solid State Components:**
 Varactor multipliers, SRD multipliers, parametric amplifier, application of PIN diodes as switches, attenuators and phase shifters, Application of microwave diodes for detector and mixing. Working principle, performance characteristics and application of microwave diodes like tunnel diode, Gunn diode, IMPATT and TRAPATT diodes.
6. **Passive Microwave Components:**
 E-plane Tee, H-plane Tee, magic Tee, directional Coupler, Isolators and circulators , Cavity resonators, performance of components using 'S' parameters.

7. **Microwave Antennas:**

Basic antenna Characteristics such as gain, directivity, radiation pattern, efficiency, effective area, aperture , beamwidth, bandwidth,polarization, Helical antenna, Horn and lense antenna, Reflector antenna, Antenna parameters measurement.

8. **Microwave measurement:**

Measurement of frequency wavelength, power, VSWR and attenuation at microwave frequencies.

9. **Introduction to Radar :**

Principle of Radar, radar Range equation, Pulsed radar, Doppler radar, MTI radar, FM-CW radar, Synthetic aperture radar, Components used in radar systems, radar transmitter and receiver.

10. **Principle of Electromagnetic Compatibility :**

Sources of E.M. interference, interference Coupling, grounding and shielding methods, measurement methods, field strength and Conducted interference.

Reference Books:-

1. Microwave devices and Circuits - **SAMUEL Liao** (PH).
2. antenna Eng. Handbook - **Jasik** (MH)
3. Foundations of M.W.Eng. - **R.E.Collins**.
4. Antennas - **KRAUSS**.
5. Principles of Electromagnetic Compatability - **B.E.Keis**. (Artech House)
6. Microwave Engineering – **Annapoorna Das and Sisir K.das**.
(Tata MC Graw-Hill, New Delhi)
7. Electronic Communication – **John Kennedy**.(TMH).
8. Microwave - **Sanjeeva gupta** (Khanna pub.)

SAURASHTRA UNIVERSITY, RAJKOT
B.E.SEMESTER-VI (E.C.)
(606) : Seminar

THEORY SCHEME		EXAMINATION SCHEME				
THEORY Hours	PRACTICAL Hours	THEORY Marks	PAPER Hours	PRACTICAL/ORAL Marks	TERMWORK Marks	TOTAL Marks
-	02	-	-	25	25	50

This will be a College based examination.

All the candidates will be required to present their topic of seminar, before a panel of 2

Internal (i.e. College) staff-members.