SEMESTER – VII

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T.V. ENGINEERING **EC – 7001**

Course Code	**EC – 7001**	Credits: 4	L-3, T-1, P-0
Name of the Course	**T.V. ENGINEERING**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A

PRINCIPLES OF TV:

- Picture elements, Theory of line, frame and field frequencies Blanking, Synchronization, interfacing, resolution, vertical resolution, horizontal resolution and video bandwidth. Use of AM in video and FM in audio.
- Block Diagram of TV Transmitter and Receiver.
- Construction of composite video signal.

Section B

TELEVISION CAMERAS AND PICTURE TUBES:

- Spectrum of light and eye response.
- Image orthicon, plumbicon, vidicon (Principles of operation, Construction and working).
- TV picture tube details.
- Modulation system used for sound and picture.
- VSB working.
- TV transmitter.

Section C

TV RECEIVER:

Block Diagram of TV Receiver, Tuner Circuits, Choice of IF amplifier, A.M. & F.M. detectors, Receiver sweep circuits, Video Frequency amplifier, synch. Pulse representation, deflection circuits.

Section D

COLOUR TV:

Hue, Saturation and luminance, Luminance and colour signal generation, colour picture tubes (Basic principles and construction), colour subcarrier and colour triangle.

- NTPC, PAL, SECAM systems.
- Colour TV transmission & reception.
- Block Diagram of digital TV with merits.

Books Recommended:-

1. Gulati R.R. – Monochrome & Colour TV.
2. Grob G.M. – 'BASIC Television' McGraw Hills'.
3. Dhake TV Engg. – Tata McGraw Hills.

SEMESTER – VII

OPTICAL FIBRE COMMUNICATION **EC – 7002**

Course Code	**EC –7002**	Credits: 4	L-3, T-1, P-0
Name of the Course	**OPTICAL FIBRE COMMUNICATION**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

Need for Fiber Optic Communications System, Role of Fiber Optic communication technology, Basic Block Diagram, Advantages & Disadvantages of Optical Fiber Communication, Ray Theory, Electromagnetic Mode Theory, Step Index Fiber, Graded Index Fiber, Attenuation- Bending Loses, Scattering, Absorption, Dispersion – Intermodal, Chromatic, limitations & remedies.

SECTION – B

Light sources & Transmitters – Light Emitting Diodes, laser diodes, Principle of action, characteristics, efficiency, Block Diagram and typical circuits of Transmitter.

SECTION – C

Receivers, Photodiodes - Working, Power relationship, PIN photodiodes, Avalanche photodiode, Block Diagram & typical circuits of receiver.

SECTION – D

Fiber Cable Connecterization– Splicing, Connectors, components of Fiber Optic Networks, Transceivers, Semiconductor, optical amplifiers - Principle of operation, Gain, Bandwidth, Cross talk, Noise, Applications, Advantages& Disadvantages.

Erbium Doped Fiber Amplifiers (EDFAs) - Operation, gain, noise, Components of EDFA module

Books Recommended:

1. Fiber Optic Comm. Systems – D.K.Mynbaev Pearson Education.
2. Optical Fiber Comm. Principle – John M.Senior PHI Pub.
3. Optical Fiber Comm. Principle – G.Keiser.

SEMESTER – VII

COMPUTER NETWORK & DATA COMMUNICATION EC (ID) – 7003

Course Code	**EC (ID) – 7003**	Credits: 4	L-3, T-1, P-0
Name of the Course	**COMPUTER NETWORK & DATA COMMUNICATION**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A

Introduction

User of computer Networks LAN, MAN, WAN, Wireless Networks, Networks software; Protocol hierarchies, design issues of layers interfaces and services. The OSI reference model, the TCP/IP reference model

The Physical Layer :

Fourier analysis, maximum data rate of a channel, transmission media, wireless transmission, narrow band ISDN, Broadband ISDN and ATM; Virtual circuits versus circuits switching.

Section B

Data link layer

Data link layer design issues; services provided to network layers, framing, error control, flow control, error detection and correction. Elementary data link protocol; an unrestricted simplex protocol. A simplex stop and wait protocol, simplex protocol for noisy channel, sliding window protocol; a one bit sliding window protocol, a protocol using go back-N, a protocol using selective repeat ,Protocol specification and verification, example data link protocols;HLDC- high level data link control.

SECTION C

The Medium Access Sub layer:

Channel allocation problem; static and dynamic channel allocation in LAN's and MAN's multiple access protocols- ALOHA carrier Multiple access protocol, WDMA protocol, wireless LAN protocol collision free protocols, limited contention protocols, IEEE standards 802.3 and Ethernet, IEEE standard 802.4 token bus, IEEE standard 802.5 token, ring. Distributed queue dual bus, logical link control bridges, high speed LANs, Satellite network.

SECTION D

Networks, layer design issues, routing algorithms, congestion control algorithm, internetworking.

TRANSPORT LAYER: Transport services, elements of transport protocols, simple transport protocol, overview of application layer (TCP, UDP).

Reference Books:

1. Computer Networks by Tenanbaum (3rd edition)
2. Data & Computer Communication by Black.
3. Data Communication and Networking by FORAUZAN.

SEMESTER - VII

RADAR AND NAVIGATION EC – 7004

Course Code	**EC – 7004**	Credits : 4	L-3, T-1, P-0
Name of the Course	**RADAR AND NAVIGATION**		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

Instructions

- **For Paper Setters**: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- **For candidates**: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION A:

Basic RADAR system, Frequencies and Powers used in Radar, Radar equation, prediction of range, detection of signals in Noise, receiver noise and S/N ratio, integration of radar pulses, prf (pulse repetition frequency) and range ambiguity, Antenna parameters, system losses.

SECTION B:

Doppler effect, Moving Target Indicator RADAR, Continuous Wave Doppler RADAR, FM-CW RADAR, Pulsed Doppler RADAR, RADAR beacons, Tracking RADAR -Monopulse Tracking, Conical scan and frequency lobing, clutters, applications of radar, delay lines.

SECTION C:

RADAR Transmitters: brief idea of Radar RF sources, transmitter noise and spectrum. Radar Receivers: Noise Figure, Superhetrodyne Receiver, Mixer, Dynamic Range, Oscillator, Amplifiers, detector, Duplexer, Radar Displays, Radar Antennas.

SECTION D:

Introduction to navigation, Four methods of Navigation, VHF Phase comparison Direction Finder, Radio Ranges; LF/MF four course radio ranges, VOR, Instrument Landing System, Ground Controlled Approach-Surveillance RADAR and Precision approach RADAR, Synthetic aperture Radar

Reference Books:

1.N.S. Nagaraja, Elements of Electronic Navigation.
2.Skolnik, Introduction to Radar systems, 2nd Edition.
3.George F Kennedy, Principles of Communication Systems.

SEMESTER – VII

DIGITAL SYSTEM DESIGN **EC(ID) – 7005**

Course Code	**EC** (ID**) – 7005**	Credits: 4	L-3, T-1, P-0
Name of the Course	**DIGITAL SYSTEM DESIGN**		
Lectures to be delivered	52 (1 Hr Each) (L = 39, T = 13 for each semester)		
Semester End Examination	Max. Time: 3 hrs.	Max. Marks: 100	Min. Pass Marks: 40
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		Max. Marks: 50	

Instructions

- **For Paper Setters**: The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.
- **For candidates**: Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

SECTION – A

INTRODUCTION

Introduction to Computer aided design tools for digital systems. Hardware description languages; introduction to VHDL, data objects, classes and data types, Operators, Overloading, Logical operators. Types of delays Entity and Architecture declaration. Introduction to behavioral, data flow and structural models.

SECTION – B

VHDL STATEMENTS:

Assignment statements, sequential statements and process, conditional statements, case statement Array and loops, resolution functions, Packages and Libraries, concurrent statements.

Subprograms: Application of Functions and Procedures, Structural Modeling, component declaration, structural layout and generies.

SECTION – C

COMBINATIONAL CIRCUIT DESIGN:

VHDL Models and Simulation of combinational circuits such as Multiplexers, Demultiplexers, encoders, decoders, code converters, comparators, implementation of Boolean functions etc.

SEQUENTIAL CIRCUITS DESIGN:

VHDL Models and Simulation of Sequential circuits.

Shift Registers, Counters etc.

SECTION – D

DESIGN OF MICROCOMPUTER:

Basic components of a computer, specifications, architecture of a simple microcomputer system, implementation of a simple microcomputer system using VHDL.

DESIGN WITH CPLDs AND FPGAs:

Programmable logic devices: ROM, PLAs, PALs, GAL, PEEL, CPLDs and FPGA. Design implementation using CPLDs and FPGAs.

REFERENCE BOOKS:

1. IEEE Standard VHDL Language Reference Manual (1993).
2. Digital Design and Modelling with VHDLand Synthesis: KC Chang; IEEE Computer Society Press.
3. “A VHDL Primmer”: Bhasker; Prentice Hall 1995.
4. “Digital System Design using VHDL”: Charles.H.Roth; PWS (1998)
5. “VHDL-Analysis & Modelling of Digital Systems” : Navabi Z; McGraw Hill.
6. VHDL – IV Edition: Perry TMH (2002)
7. “Introduction to Digital Systems”: Ercegovac. Lang & Moreno; John Wiley (1999).
8. Fundamentals of Digital Logic with VHDL Design: Brown and Vranesic; TMH (2000).
9. Modern Digital Electronics – III Edition: R.P.Jain; TMH (2003)

SEMESTER – VII

BIOMEDICAL ELECTRONICS EC – 7006

Course Code	**EC – 7006**	Credits: 4	L-3, T-1, P-0
Name of the Course	**BIOMEDICAL ELECTRONICS**		
Lectures to be delivered	**52 (1 Hr Each) (L = 39, T = 13 for each semester)**		
Semester End Examination	**Max. Time: 3 hrs.**	**Max. Marks: 100**	**Min. Pass Marks: 40**
Continuous Assessment (based on sessional tests 50%, Tutorials/Assignments 30%, Quiz/Seminar 10%, Attendance 10%)		**Max. Marks: 50**	

Instructions

- **For Paper Setters:** The question paper will consist of five sections A, B, C, D & E. Section E will be compulsory, it will consist of a single question with 10-20 subparts of short answer type, which will cover the entire syllabus and will carry 20% of the total marks of the semester end examination for the course. Section A, B, C & D will have two questions from the respective sections of the syllabus and each question will carry 20% of the total marks of the semester end examination for the course.

- **For candidates:** Candidates are required to attempt five questions in all selecting one question from each of the sections A, B, C & D of the question paper and all the subparts of the questions in Section E. Use of non-programmable calculators is allowed.

Section A

BIOELECTRIC SIGNALS: Origin and Electrodes for ECG, EEG and EMG signals.
PSYCHOLOGICAL TRANSDUCERS:- Pressure and temperature Transducers, Pulse sensors, Respiration Sensors.
PATIENT SAFETY: - Electric sock Hazards, Leakage currents instrument for checking safety parameters.

Section B

RECORDING SYSTEM; basic recording system, sources of noise in low level recording circuits, pre amplifiers, drivers, various types of records-Inkjet, Potentiometer, UV, thermal array, electrostatic, light gate array.
BIOMEDICAL RECORDS:- Electrocardiograph, phonocardiograph, Electroencephalograph , Electromyograph.

Section C

MEDICAL DISPLAY SYSTEM :- Oscilloscopes, cardio scope, multichannel Display, Nonfade display system.
IMAGE SYSTEMS:- Introduction Basic Principle & Block Diagram of X-ray Machine, Computer Tomography and Nuclear Magnetic Resonance (NMR) Tomography, Ultrasonic Imaging Systems, Ultrasound.

Section D

CARDIAC PACEMAKERS:- Externals, implantable & Programmable pacemakers, power sources for implantable pacemakers, Leads and electrodes.
CARDIAC DEFIBRILLATOR:- DC- Defibrillators, Defibrillator Electronic, Implantable defibrillators.
BIO-TELEMETRY:- wireless telemetry system, multichannel wireless telemetry.
PATIENT MONITORING SYSTEM.

Reference Books: -

1. Hand Book of Biomedical instrumentation - R.S. Khandpur (TMH)
2. Biomedical Electronics - Cromwell.,PHI
3. Biomedical Instruments Theory and design by Walter Welko Witiz.

SEMESTER - VII

T.V. ENGINEERING LAB **EC – 7007**

Course Code	**EC – 7007**	Credits: 2	L-0, T-0, P-2
Name of the Course	**T.V. ENGINEERING LAB**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

I) Performing a practical examination assigned by the examiner (25 marks).

II) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS:

1. To identify Receiver components and locate different stages on the chasis of Black & White Receiver.
2. To identify Receiver components and locate different stages on the chasis of PAL colour TV Receiver.
3. To operate various controls of TV Receiver and observe their effect on Black & White Receiver.
4. To operate various controls of different stages on PAL colour TV Receiver.
5. To know dc voltages and waveforms at various points in a Black & White TV Receiver.
6. To know dc voltages and waveforms at various points in a colour TV receiver.
7. To observe the effect of brightness control on grid to cathode bias of CRT and note cut off bias for CRT.
8. To observe the effect of contrast control on luminance signal at cathode of CRT.
9. To use a colour pattern generator and subjectively evaluate Raster reproduction.
10. To install and study satellite TV Receiver system including Dish Antenna and receiver.
11. To study typical faults in different sections of Black & White TV Receiver.
12. To study typical faults in different sections of PAL colour TV Receiver.

SEMESTER - VII

OPTICAL FIBER COMMUNICATION LAB EC – 7008

Course Code	**EC – 7008**	Credits: 2	L-0, T-0, P-2
Name of the Course	**OPTICAL FIBER COMMUNICATION LAB**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time : 3 hrs**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

i) Performing a practical examination assigned by the examiner (25 marks).

ii) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

List of Experiments

1. Study Of Fiber Optic Transmitters
2. Study Of Fiber Optic Detectors
3. Study Of Simplex Fiber Optic Link
4. Study Of Duplex Fiber Optic Link
5. Study Of Digital Transceiver
6. Study of Fiber Optic LED
7. Study of Losses in Optical Fiber
8. Determination of numerical aperture of optical fibers
9. Transmission of an audio signal through an optical fiber
10. Fiber optics hybrid modules for analogue transmission models Tx & Rx

SEMESTER - VII

COMPUTER NETWORK AND DATA COMMUNICATION LAB EC (ID) – 7009

Course Code	**EC (ID) – 7009**	Credits: 2	L-0, T-0, P-2
Name of the Course	**COMPUTER NETWORK AND DATA COMMUNICATION LAB**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

I) Performing a practical examination assigned by the examiner (25 marks).

II) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS:

1. To study different types of transmission media.
2. To study 16 Quadrature Amplitude Multiplexing.
3. To study Serial Interface and its applications.
4. To configure the modem of a computer.
5. To make inter-connections in cables for data communication in LAN.
6. To install LAN using Tree topology.
7. To install LAN using STAR topology.
8. To install LAN using Bus topology.
9. To configure a HUB/Switch.

SEMESTER - VII

DIGITAL SYSTEM DESIGN LAB **EC – 7010**

Course Code	**EC – 7010**	Credits: 2	L-0, T-0, P-2
Name of the Course	**DIGITAL SYSTEM DESIGN LAB**		
Lectures to be delivered	**26 hours of Lab sessions**		
Semester End Examination	**Max. Time: 3 hrs**	**Max. Marks: 50**	**Min. Pass Marks: 20**
Laboratory	**Continuous Assessment (based on Lab work 30%, Lab record 25%, Viva 25%, Attendance 20%)**	**Max. Marks: 50**	**Min. Pass Marks: 25**

Instructions for paper setter/Candidates

Laboratory examination will consist of two parts:

I) Performing a practical examination assigned by the examiner (25 marks).

II) Viva-voice examination (25 marks).

Viva-voice examination will be related to the practicals performed/projects executed by the candidate related to the paper during the course of the semester.

LIST OF EXPERIMENTS:

1. Design all gates using VHDL.
2. Write VHDL programs for the following circuits, check the waveforms and the hardware generated
   a) Half adder.
   b) Full adder.
3. Write VHDL programs for the following circuits, check the waveforms and the hardware generated
   a) Multiplexer.
   b) Demultiplexer.
4. Write VHDL programs for the following circuits, check the waveforms and the hardware generated
   a) Decoder.
   b) Encoder.
5. Write a VHDL programs for a comparator and check the waveforms and the hardware generated
6. Write a VHDL programs for a flip-flop and check the waveforms and the hardware generated.
7. Write a VHDL programs for a counter and check the waveforms and the hardware generated.
8. Write a VHDL programs for a code converter and check the waveforms and the hardware generated.
9. Write a VHDL programs for a following circuits and check the waveforms and the hardware generated.
   a. Register
   b.shift register
10. Implement any three (given above) on FPGA/CPLD kit.

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