EMBEDDED SYSTEMS

Paper Code: ETEC-401	**L**	**T/P**	**C**
Paper: Embedded Systems	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of the paper is to enable a student to design an embedded system for specific tasks.

UNIT- I

Overview of Embedded Systems: Characteristics of Embedded Systems. Comparison of Embedded Systems with general purpose processors. General architecture and functioning of micro controllers. 8051 micro controllers.

PIC Microcontrollers: Architecture, Registers, memory interfacing, interrupts, instructions, programming and peripherals.

[T1][No. of hrs. 12]

UNIT- II

ARM Processors: Comparison of ARM architecture with PIC micro controller, ARM 7 Data Path, Registers, Memory Organization, Instruction set, Programming, Exception programming, Interrupt Handling, Thumb mode Architecture.

Bus structure: Time multiplexing, serial, parallel communication bus structure. Bus arbitration, DMA, PCI, AMBA, I2C and SPI Buses.

[T2][No. of hrs. 12]

UNIT- III

Embedded Software, Concept of Real Time Systems, Software Quality Measurement, Compilers for Embedded System.

[T3][No. of hrs. 10]

UNIT-IV

RTOS: Embedded Operating Systems, Multi Tasking, Multi Threading, Real-time Operating Systems, RT-Linux introduction, RTOS kernel, Real-Time Scheduling.

[T3][No. of hrs. 10]

Text Book:

[T1] Design with PIC Microcontrollers, John B. Peatman, Pearson Education Asia, 2002
[T2] ARM System Developer's Guide: Designing and Optimizing System Software, Andrew N. Sloss, Dominic Symes, Chris Wright, Morgan Kaufman Publication, 2004.
[T3] Computers as components: Principles of Embedded Computing System Design, Wayne Wolf, Morgan Kaufman Publication, 2000

References Books:

[R1] The Design of Small-Scale embedded systems, Tim Wilmshurst, Palgrave2003
[R2] Embedded System Design , Marwedel ,Peter , Kluwer Publishers , 2004.

OPTOELECTRONICS AND OPTICAL COMMUNICATION

Paper Code: ETEC-403	**L**	**T/P**	**C**
Paper: Optoelectronics and Optical Communication	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objective: The objective of this paper is to introduce the student about Optical Fiber, Wave propagation, Detectors and its structures and functions.

UNIT - I

Introduction: Optical Fiber: Structures, Wave guiding and Fabrication – Nature of light, Basic optical laws and Definition, Optical fiber modes and Configuration, Mode theory for circular waveguides, Single mode fibers, Graded index fiber, Fiber materials, Fabrication and mechanical properties, Fiber optic cables, Basic Optical Communication System, Advantage of Optical Communication System .

[T1, T2][No. of Hrs.10]

UNIT – II

Attenuation in Optical Fibers: Introduction, Absorption, Scattering, Very Low Loss Materials, All Plastic & Polymer-Clad-Silica Fibers.

Wave Propagation: Wave propagation in Step-Index & Graded Index Fiber, Overall Fiber Dispersion-Single Mode Fibers, Multimode Fibers, Dispersion-Shifted Fiber, Dispersion, Flattened Fiber, Polarization.

[T1, T2][No. of Hrs.11]

UNIT – III

Source & Detectors: Design & LED's for Optical Communication, Semiconductor Lasers for Optical Fiber Communication System and their types, Semiconductor Photodiode Detectors, Avalanche Photodiode Detector & Photo multiplier Tubes. Source to fiber power launching - Output patterns, Power coupling, Power launching, Equilibrium Numerical Aperture, Laser diode to fiber coupling. Optical detectors- Physical principles of PIN and APD, Detector response time, Temperature effect on Avalanche gain, Comparison of Photo detectors. Optical receiver operation- Fundamental receiver operation, Digital signal transmission, error sources, Receiver configuration, Digital receiver performance, Probability of error, Quantum limit, Analog receivers .

[T1, T2][No. of Hrs.11]

UNIT – IV

Optical Fiber Communication Systems: Data Communication Networks – Network Topologies, Mac Protocols, Analog System. Advanced Multiplexing Strategies – Optical TDM, Sub carrier Multiplexing, WDM Network. Architectures: SONET/SDH. Optical Transport Network, Optical Access Network, Optical Premise Network. **Applications**-Military Applications, Civil, Consumer & Industrial Applications.

[T1, T2][No. of Hrs.12]

Text Books:

[T1] J. Gowar, "Optical Communication System", IEEE Press – 2nd Edition.
[T2] R.P.Khare, "Fiber Optics and Opto Electronics" Oxford Publication

Reference Books:

[R1] Optical Information Processing – F. T. S. Yu – Wiley, New York, 1983
[R2] G. P. Agrawal, Fiber optic Communication Systems, John Wiley & sons, New York, 1992
[R3] A. Ghatak, K. Thyagarajan, "An Introduction to Fiber Optics", Cambridge University Press
[R4] J. H. Franz & V. K. Jain, "Optical Communication Components & Systems", Narosa Publish, 2013
[R5] John M. Senior, "Optical Fiber Communications", Pearson, 3rd Edition, 2010.

WIRELESS COMMUNICATION

Paper Code: ETEC-405	**L**	**T/P**	**C**
Paper: Wireless Communication	**3**	**1**	**4**

INSTRUCTIONS TO PAPER SETTER: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the course is to introduce various wireless networks, mobile networks and their basic architecture starting from 2G through to 3G and 4G.

UNIT – I

Introduction To Wireless Communication Systems: Evolution of mobile radio communications; examples of wireless comm. systems; paging systems; Cordless telephone systems; overview of generations of cellular systems, comparison of various wireless systems.

Introduction to Personal Communication Services (PCS): PCS architecture, Mobility management, Networks signaling. A basic cellular system, multiple access techniques: FDMA, TDMA, CDMA.

Introduction to Wireless Channels and Diversity: Fast Fading Wireless Channel Modeling, Rayleigh/Ricean Fading Channels, BER Performance in Fading Channels, Introduction to Diversity modeling for Wireless Communications

[T1,T2][No. of Hrs. 11]

UNIT - II

2G Networks: Second generation, digital, wireless systems: GSM, IS_136 (D-AMPS), IS-95 CDMA. Global system for Mobile Communication (GSM) system overview: GSM Architecture, Mobility Management, Network signaling, mobile management, voice signal processing and coding. **Spread Spectrum Systems-** Cellular code Division Access Systems-Principle, Power Control, effects of multipath propagation on code division multiple access.

[T1,T2][No. of Hrs. 11]

UNIT - III

2.5G Mobile Data Networks: Introduction to Mobile Data Networks, General Packet Radio Services (GPRS): GPRS architecture, GPRS Network nodes, EDGE,Wireless LANs, (IEEE 802.11), Mobile IP.

Third Generation (3G) Mobile Services: Introduction to International Mobile Telecommunications 2000 (IMT 2000) vision, Wideband Code Division Multiple Access (W-CDMA), and CDMA 2000, Quality of services in 3G, Introduction to 4G.

[T1,T2][No. of Hrs. 11]

UNIT – IV

Wireless Local Loop (WLL): Introduction to WLL architecture, WLL technologies. Wireless personal area networks (WPAN): Blue tooth, IEEE 802.15, architecture, protocol stack. Wi-Max, introduction to Mobile Adhoc Networks.

Global Mobile Satellite Systems, Case studies of IRIDIUM and GLOBALSTAR systems.

[T1,T2][No. of Hrs. 11]

Text Books:

[T1] Raj Pandya, "Mobile & Personnel communication Systems and Services", Prentice Hall India, 2001.
[T2] Theodore S. Rappaport, "Wireless Communication- Principles and practices," 2nd Ed., Pearson Education Pvt. Ltd, 5th Edition, 2008.

Reference Books:

[R1] T.L.Singhal "Wireless Communication", Tata McGraw Hill Publication.
[R2] Jochen Schiller, "Mobile communications," Pearson Education Pvt. Ltd., 2002.
[R3] Yi –Bing Lin & Imrich Chlamatac, "Wireless and Mobile Networks Architecture," John Wiley & Sons, 2001.
[R4] Lee, W.C.Y., "Mobile Cellular Telecommunication", 2nd Edition, McGraw Hill,1998.
[R5] Smith & Collins, "3G Wireless Networks," TMH, 2007
[R6] Schiller, Jochen, "Mobile Communications", 2nd Edition, Addison Wesley

ADVANCED DIGITAL SIGNAL PROCESSING

Paper Code: ETEC-407	**L**	**T/P**	**C**
Paper: Advanced DSP	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks

Objectives: The prerequisites are signals and systems, analog and digital communication, digital signal processing. The objective of the paper is to learn the advanced techniques used in DSP.

UNIT-I

Multirate DSP: Overview of Mathematical description of change of sampling rate, Filter design & implementation for sampling rate conversion, Multistage implementation of sampling rate conversion ,Sampling rate conversion of band pass signal, sampling rate conversion by an arbitrary factor, Application of multi rate signal processing, poly phase structures, multirate identities, quadrature mirror filter& perfect reconstruction, calculation of amplitude & Phase distortion.

Adaptive System

Definition and Characteristics, Areas of Application, Example of an Adaptive System, Adaptive Linear Combiner and The Performance Function; Gradient and Minimum Mean-Square Error, Alternative Expression of the Gradient, De-correlation of Error and Input Components.

[T1, T2, R2] [No. of Hours 12]

UNIT II

Spectrum Estimation: Estimation of spectra from finite duration signals,

Non-Parametric Methods-Correlation Method - Periodogram Estimator, Performance Analysis of Estimators, Unbiased consistent Estimators, Modified periodogram, Bartlett and Welch methods, Blackman - Tukey method

Parametric Methods - AR - MA - ARMA model based spectral estimation, Parameter Estimation, Yule-Walker equations, Solutions using Durbin's algorithm

[T1, T2, R2] [No. of Hours 11]

UNIT III

Wiener Filter: Linear Optimum Filtering, Principle of Orthogonally, Minimum Mean Square Error, Wiener-Hopf Equation, Error Performance Surface.

Linear Prediction: Forward Linear Prediction, Backward Linear Predict ion, Properties of Prediction Error Filters

Method of Steepest Descent: Basic Idea of Steepest-Descent Algorithm, Steepest-Descent Algorithm Applied to Wiener Filter, Stability of Steepest-Descent Algorithm, and Limitations of Steepest-Descent Algorithm.

[T1] [No. of Hours 11]

UNIT IV

Least-Mean Square Adaptive Filter: Overview, LMS Adaptation Algorithm, Application, Comparison of LMS with Steepest-Descent Algorithm.

Normalized Least-Mean Square Adaptive Filter: Normalized LMS Filter as the Solution to Constrained Optimization Problem, Stability of the NLMS.

[T1, R1] [No. of Hours 10]

Textbooks:

[T1] Simon Haykin, Adaptive Filter Theory, 4th Edn. Pearson Education

[T2] John G. Proakis, Dimitris G. Manolakis, Digital Signal Processing Principal Algorithm & Application,3rd Edition, Pearson Education, 2002

Reference Book:

[R1] Bernard Widrow and Samuel D. Stearns, Adaptive Signal Processing, Pearson Education

[R2] Monson H. Hayes, Statistical Digital Signal processing and Modeling, John Wiley and Sons, Inc., Singapore, 2002.

INTRODUCTION TO MEMS

	L	T/P	C
Paper Code: ETEC-409			
Paper: Introduction to MEMS	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTER: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to introduce the introductory ideas of micro electro mechanical switches, filters, phase shifters, antennas and their applications.

UNIT- I:

Introduction: Introduction and origin of MEMS, Micro fabrications for MEMS, Electromechanical transducers, Electrothermal actuators, Microsensing for MEMS, Materials for MEMS, fabrication techniques, Semiconductors, Electrical and chemical properties, Growth and deposition, Thin films for MEMS and their deposition techniques, Oxide film formation by thermal oxidation, Deposition of silicon dioxide and silicon nitride, Bulk micromachining for silicon-based MEMS, Isotropic and orientation-dependent wet etching, Dry etching, Silicon surface micromachining, scanning method.

[T1,T2][No. of Hrs. 12]

UNIT- II:

RF MEMS elements: Switches, Mechanical switches, Electronic switches, Switches for RF and microwave applications, Micro relays; Bistable micro relays and micro actuators, MEMS inductors and capacitors, Modeling and design issues.

[T1,T2][No. of Hrs. 10]

UNIT- III:

Micromachined RF filters: General considerations and modeling, Micromechanical filters, Electrostatic comb drive, Micromechanical filters using comb drives, Micromechanical filters using electrostatic coupled beam structures, Surface acoustic wave filters, Design of interdigital transducers, Single-phase unidirectional transducers, Bulk acoustic wave filters, Micromachined filters for millimeter wave frequencies.

[T1,T2][No. of Hrs. 10]

UNIT- IV:

MEMS phase shifters transmission lines, components and Antenna: phase shifters and their limitations, Micromachined transmission lines, Losses in transmission lines, Overview of microstrip antenna, Integration and packaging for RF MEMS devices, Role of MEMS packages.

[T1,T2][No. of Hrs. 10]

Text books:

[T1] Vijay K. Varadan K.J. Vinoy and K.A. Jose, "RF MEMS and Their Applications", John Wiley USA
[T2] Mohamed Gad-el-Hak, "MEMS Design and Fabrication Edited", Taylor and Francis.

Reference Books:

[R1] Mohamed Gad-el-Hak, "MEMS Introduction and Fundamentals Edited", Taylor and Francis
[R2] Christian C. Enz and Andreas Kaiser, "MEMS-based Circuits and Systems for Wireless Communication", Springer
[R3] P Rai Choudhury, "MEMS and MOEMS Technology and applications" –PHI Learning Pvt Ltd, India
[R4] Sergey Y.Yurish and Maria Teresa S.R. Gomes, "Smart Sensors and MEMS", Kluwer Academic Publisher
[R5] Mohamed Gad-el-Hak, Taylor and Francis MEMS Applications, The MEMS handbook .

ADVANCE VLSI DESIGN

	L	T/P	C
Paper Code: ETEC-411			
Paper: Advance VLSI Design	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTER: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to study the advance VLSI design. The students are introducing to MOS technology, design rules and some applications.

UNIT I

Small signal & large signal models of MOS & BJT transistor, MOS & BJT transistor Amplifiers: single transistor Amplifiers stages: Common Emitter, Common base, Common Collector, Common Drain, Common Gate & Common Source Amplifiers, Frequency response of amplifiers.

Multiple transistor amplifier stages: CC-CE, CC-CC, & Darlington configuration, Cascode configuration, Active Cascode, Differential amplifiers: Differential pair & DC transfer characteristics.

[T1,T2][No. of Hours: 11]

UNIT II

Current Mirrors, Active Loads & References, current mirrors, simple current mirror, Cascode current mirrors Widlar current mirror, Wilson Current mirror, Active loads, Analysis of differential amplifier with active load, supply and temperature independent biasing techniques.

[T1,T2][No. of Hours: 11]

UNIT III

Operational Amplifier: applications of operational Amplifier, theory and Design; Definition of Performance Characteristics; Design of two stage MOS Operational amplifier, two stage MOS operational amplifier with cascodes, MOS telescopic-cascode operational amplifiers, MOS folded-cascode operational amplifiers, Bipolar operational amplifiers, Frequency response & compensation.

[T1,T2][No. of Hours: 11]

UNIT IV

Voltage controlled oscillator, Comparators, Source follower, Phase locked techniques; Phase Locked Loops (PLL), closed loop analysis of PLL. Digital-to-Analog (D/A) and Analog-to-Digital (A/D) Converters, OTA Amplifiers, Switched Capacitor Filters.

[T1,T2][No. of Hours: 11]

Text books:

[T1] P. R. Gray, P. J. Hurrt, S. H. Lweic, RoG. Meyer, "Analysis and Design of Analog Integrated Circuits" John Wiley and Sons Inc. 2001.

[T2] P. E. Allen, D. R. Holberg, "CMOS Analog Circuit Design" Oxford University Press 2002.

Reference Books:

[R1] B. Razavi, "Design of Analog CMOS Integrated Circuits", TMH – 2002.

[R2] R. J. Baker, H. W. Li and D. E. Boyce, "CMOS Circuit Design, Layout and Simulation", PHI

[R3] Ken Martin, "Digital Integrated Circuit Design", Oxford University Press.

[R4] Yaniiis Tsividis and Colin Mcandrew, "The MOS Transistor", Oxford University Press, 2013

[R5] Geiger, Allen, Strader "VLSI Design Techniques for Analog and Digital Circuits" McGraw Hill, 1990

BIOMEDICAL INSTRUMENTATION

Paper Code: ETIC-403	**L**	**T/P**	**C**
Paper: Biomedical Instrumentation	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1.. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.

2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective:-The objective of teaching this subject is to make students understand the applications of electronics in diagnostic and therapeutic area. Further the methods of recording various bio potentials; measurement of biochemical and physiological information are explained. The topics such as Patient Monitoring systems, Audiometers, imaging systems, Patients safety are also included. The emerging Computer Applications in Biomedical field are also dealt with.

UNIT I

Biomedical signals & Physiological transducers: Source of biomedical signal, Origin of bioelectric signals, recording electrodes, Electrodes for ECG, EMG & EEG .Physiological transducers: Pressure, Temperature, photoelectric & ultrasound Transducers. Measurement in Respiratory system**:** Physiology of respiratory system, Measurement of breathing mechanics Spiro meter, Respiratory therapy equipments Inhalators ventilators & Respirators , Humidifiers , Nebulizers Aspirators, Biomedical recorders: ECG, EEG & EMG.

[T1, T2][No of Hours:-11]

UNIT II

Patient Monitoring systems & Audiometers: Cardiac monitor, Bedside patient monitor, measurement of heart rate, blood pressure, temperature, respiration rate, Arrhythmia monitor, Methods of monitoring fatal heart rate, Monitoring labor activity . Audiometers: Audiometers, Blood cell counters, Oximeter, Blood flow meter, cardiac output measurement, Blood gas analyzers.

[T1, T2][No of Hours:-11]

UNIT III

Modern Imaging systems: Introduction, Basic principle & Block diagram of x-ray machine, x- ray Computed Tomography (CT), Magnetic resonance imaging system (NMR), ultrasonic imaging system. Eco-Cardiograph, Eco Encephalography, Ophthalmic scans, MRI. Therapeutic Equipments: Cardiac pacemakers, cardiac defibrillators, Hemodialysis machine, Surgical diathermy machine.

[T1, T2][No of Hours:-11]

UNIT III

Patients safety & Computer Applications in Biomedical field: Precaution, safety codes for electro medical equipment, Electric safety analyzer, Testing of biomedical equipment, Use of microprocessors in medical instruments, Microcontrollers, PC based medical instruments, Computerized Critical care units, Planning & designing a computerized critical care unit. Physiotherapy: Software Diathermy, microwave diathermy, Ultrasound therapy unit. Electrotherapy Equipments, Ventilators.

[T1, T2][No of Hours:-11]

Text Books:

[T1] Joseph J. Carr & John M. Brown, "Introduction to Biomedical Equipment Technology", Pearson.
[T2] Shakti Chatterjee, "Textbook of Biomedical Instrumentation System", Cengage Learning

Reference Books:

[R1] R.S.Khandpur, "Hand book of Biomedical Instrumentation", TMH
[R2] Walter Welko- Witiz and Sid Doutsch, "Biomedical Instruments: Theory and Design" Wiley
[R3] Lesile Cromwell, Fred J. Weibell & Erich A. Pfeiffer, "Biomedical Instrumentation & Measurements", PHI

PLC & SCADA SYSTEMS

	L	T/P	C
Paper Code: ETEE-413			
Paper: PLC & SCADA Systems	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from question no. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this paper is to introduce the students about the knowledge of programmable logic controller, principles of PLC and functions and SCADA and its elements and functions.

UNIT-I

Programmable Logic Controller (PLC) Basics: Introduction, Parts of PLC, Principles of operation, PLC size and applications, PLC Advantages and Disadvantages, PLC Manufacturers, PLC hardware components, I/O section, Analog I/O modules, Digital I/O modules, CPU- Processor memory module, Programming devices, Devices which can be connected to I/O modules, Relay, Contactor, SPST, Push Buttons, NO/NC Concept

[T1,T2] [No of Hrs 10]

UNIT-II

Programming of Programmable Logic Controller: General PLC Programming Procedures, Contacts and Coils, Program SCAN, Programming Languages, Ladder Programming, Relay Instructions, Instruction Addressing, Concept of Latching, Branch Instructions, Contact and Coil I/O Programming Examples, Relation of Digital Gate Logic to Contact/Coil Logic.

[T1,T2] [No of Hrs 12]

UNIT-III

Programmable Logic controller Functions: Timer Instructions: ON DEAY Timer and OFF DELAY timer, Counter Instructions: UP/DOWN Counters, Timer and Counter Applications, Program Control Instructions: Master Control Reset, Jump and Subroutine,
Math Instructions- ADD, SUB. Data Handling: Data Move, Data Compare, Data Selection, Electro-pneumatic Sequential Circuits and Applications.

[T1,T2] [No of Hrs 12]

UNIT-IV

SCADA: Definition of SCADA, Applicable Processes, Elements of SCADA System, A Limited Two-Way System. Real Time Systems: Communication Access and Master-Slave determining scan interval. Introduction to Remote Control, Communications-A/D Conversion, Long Distance Communication, Communication System components in brief- Protocol, Modems, Synchronous/Asynchronous telephone cable/radio, Half Duplex, Full Duplex System, Brief introduction to RTU and MTU, Applications-Automatic Control, Advisory Applications.

[R1] [No of Hrs 10]

Text Books:

[T1] Frank D. Petruzella "Programmable Logic Controllers", McGraw-Hill Book Company.
[T2] John w. Webb and Ronald A. Reis, "Programmable Logic Controllers", PHI

Reference Books:

[R1] Stuart A.Boyer "Supervisors Control and Data Acquisition", ISA
[R2] William I. Fletcher "An Engineering Approach to Digital Design", PHI.
[R3] Simpson, Colin "Programmable Logic Controllers", Englewood Cliffs NJ PHI.
[R4] Gray Dunning, "Introduction to Programmable Logic Controllers", Delmar Thompson Learning
[R5] Stenerson, John "Fundamentals Logic Controllers Sensors, & Communications", Englewood Cliffs, NJ, 1993. Prentice Hall.
[R6] Programmable Logic Controllers, W.Bolton, Elsevier

POWER ELECTRONICS

	L	T/P	C
Paper Code: ETEE-415			
Paper: Power Electronics	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to facilitate the student with the basics of Power Electronics that are required for an engineering student.

UNIT- I

Introduction

Characteristics and switching behaviour of Power Diode, SCR, UJT, TRIAC, DIAC, GTO, MOSFET, IGBT, MCT and power BJT, two-transistor analogy of SCR, firing circuits of SCR and TRIAC, SCR gate characteristics, SCR ratings. Protection of SCR against over current, over voltage, high dV/dt, high dI/dt, thermal protection, Snubber circuits, Methods of commutation, series and parallel operation of SCR, Driver circuits for BJT/MOSFET.

[T1,T2][No. of hrs. 11]

UNIT- II

A.C. to D.C. Converter: Classification of rectifiers, phase controlled rectifiers, fully controlled and half controlled rectifiers and their performance parameters, .three phase half wave, full wave and half controlled rectifiers and their performance parameters, effect of source impedance on the performance of single phase and three phase controlled rectifiers, single-phase and three phase dual converter.

[T1, T2, T3][No. of hrs. 11]

UNIT- III

D.C. to D.C. Converter: Classification of choppers as type A, B, C, D and E, principle of operation, switching mode regulators: Buck, Boost, Buck-Boost, Cuk regulators.

A.C. to A.C. Converter: AC voltage Controllers**,** Cyclo-converters : single phase to single phase, three phase to single phase, three phase to three phase Cyclo-converter circuit and their operation, Matrix converter.

[T1, T2, T3][No. of hrs. 11]

UNIT-IV

D.C. to A.C. Converter: single phase single pulse inverter: Square wave, quasi square. Three phase single pulse inverters (120° and 180°conduction) Modulation Techniques and reduction of harmonics, PWM techniques, SPWM techniques, SVM, Carrier less modulation. , PWM Inverter, Bidirectional PWM converters, voltage source inverters and current source inverter, Multi level Inverter: cascaded and NPC Inverters.

[T1, T2, T3][No. of hrs. 11]

Text Books:

[T1] M.H. Rashid, "Power Electronics: Circuits, Devices and Applications" Pearson Publications.

[T2] Daniel W. Hart, "Power Electronics "Tata McGraw-Hill

[T3] H.C. Rai, "Power Electronics Devices, Circuits, Systems and Application", Galgotia Publications, 3rd Edition

References Books:

[R1] Singh, Kanchandani, "Power Electronics", Tata McGraw-Hill.

[R2] Ned Mohan, Tore M. Undeland and Robbins, "Power Electronics: Converters, Applications and Design" Wiley India Publication

[R3] V R Moorthi, "Power Electronics: Devices, Circuits and Industrial Applications", Oxford Publication.

[R4] Kassakian, Schlecht, Verghese, "Principles of Power Electronics" , Pearson Publications

[R5] M.S. Jamil Asghar, "Power Electronics" PHI Publication

[R6] P. S. Bimbhra "Power Electronics", Khanna Publishing.

RF DEVICES AND CIRCUITS

	L	T	C
Paper Code: ETEC-417			
Paper: RF Devices and Circuits	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the various devices and circuits for microwave and RF circuit applications.

UNIT-I

Introduction of RF and Microwaves, RF behavior of Passive components (resistor, capacitor and inductor), **Transmission line**: lumped element circuit model, wave propagation on transmission line, lossless line two wire line, coaxial line, micro strip line, terminated lossless transmission line, short circuit and open circuit terminated transmission line.

Quarter wave transformer (impedance, frequency response and multiple reflections).

[T1, T2, R1][No. of Hrs. 11]

UNIT-II

Smith chart: basic smith chart operation, combined impedance – admittance Smith chart, computation of Impedance of Passive circuits using smith chart (from reflection coefficient to load impedance)

RF network analysis : Scattering matrix, Generalized Scattering Parameters.

Impedance matching and tuning: matching with lumped element(analytic and smith chart solution), single stub tuning, shunt stub and series stub tuning.

[T1, T2, R1][No. of Hrs. 11]

UNIT-III

Power dividers: basic properties of dividers and couplers, TEE junction lossless power divider, waveguide directional coupler.

RF Filter Design : Periodic structures, analysis of infinite periodic structure, terminated periodic structure, k-β diagram and wave velocities, filter design using insertion loss method, characterization of power loss ratio, low pass prototype filter for Butterworth and Chebyshev filters, impedance and frequency transformation(only for LPF).

[T1, T2, R1][No. of Hrs. 10]

UNIT-IV

Microwave Bipolar Transistors: Physical structures, figure of merit of various geometry and power frequency limitation.

RF Field effect Transistors: Construction and functionality of MISFET, MOSFET, MESFET and High electron mobility Transistors (MODFET).

[T1, T3][No. of Hrs. 10]

Text Books:

[T1] S Y Liao, Microwave Devices and Circuits, Pearson Publications.
[T2] R.E. Collin, "Foundation for Microwave Engineering", Wiley Publications
[T3] Davis, "Radio frequency circuit design", Wiley publication

Reference Books

[R1] Reinhold Ludwig and Gene Bogdanvo, "RF Circuit design Theory and applications", Pearson Publications.
[R2] D.M Pozar, "Microwave Engineering", Wiley Publications.

DATABASE MANAGEMENT SYSTEMS

	L	T/P	C
Paper Code: ETCS-425			
Paper: Database Management Systems	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **Maximum Marks: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be 12.5 marks.

Objective: The concepts related to database, database techniques, SQL and database operations are introduced in this subject. This creates strong foundation for application data design.

UNIT-I : Introductory Concepts of DBMS: Introduction and application of DBMS, Data Independence, Database System Architecture – levels, Mapping, Database users and DBA, Entity – Relationship model, constraints, keys, Design issues, E-R Diagram, Extended E-R features- Generalization, Specialization, Aggregation, Translating E-R model into Relational model.

[T1, T2][No. of Hrs. 10]

UNIT-II : Relational Model: The relational Model, The catalog, Types, Keys, Relational Algebra, Fundamental operations, Additional Operations-, SQL fundamentals, DDL,DML,DCL PL/SQL Concepts, Cursors, Stored Procedures, Stored Functions, Database Integrity – Triggers.

[T2, R3][No. of Hrs. 10]

UNIT-III: Functional Dependencies, Non-loss Decomposition, First, Second, Third Normal Forms, Dependency Preservation, Boyce/Codd Normal Form, Multi-valued Dependencies and Fourth Normal Form, Join Dependencies and Fifth Normal Form.

[T2, R1][No. of Hrs. 10]

UNIT-IV: Transaction Management: ACID properties, serializability of Transaction, Testing for Serializability and concurrency control, Lock based concurrency control (2PL, Deadlocks), Time stamping methods, Database recovery management.

Implementation Techniques: Overview of Physical Storage Media, File Organization, Indexing and Hashing, B+ tree Index Files, Query Processing Overview, Catalog Information for Cost Estimation, Selection Operation, Sorting, Join Operation, Materialized views, Database Tuning.

[T1, T2, R2][No. of Hrs. 12]

Text Books:

[T1] Abraham Silberschatz, Henry F. Korth, S. Sudharshan, "Database System Concepts", 5th Edition, Tata McGraw Hill, 2006

[T2] Elmsari and Navathe, "Fundamentals of Database Systems", 4th Ed., A. Wesley, 2004

References Books:

[R1] C.J.Date, A.Kannan, S.Swamynathan, "An Introduction to Database Systems", 8th Edition, Pearson Education, 2006.

[R2] J. D. Ullman, "Principles of Database Systems", 2nd Ed., Galgotia Publications, 1999.

RENEWABLE ENERGY RESOURCES

Paper Code: ETEE-419	**L**	**T/P**	**C**
Paper: Renewable Energy Resources	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Q. No. 1 rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of the paper is to introduce the knowledge of upcoming and future promising area of renewable energy resources to the students, which is developing rapidly.

UNIT- I

Solar Energy: radiation – extra terrestrial, spectral distribution, solar constant, solar radiation on earth, measurements; solar thermal system – solar thermal power and its conversion, solar collectors, flat plate, solar concentrating collectors, - types and applications; photovoltaic (PV) technology - photovoltaic effect, efficiency of solar cells, semi-conductor materials, solar PV system, standards and applications, tracking.

[T1][No. of hrs. 10]

UNIT- II

Wind and Small Hydropower Energy: wind data, properties, speed and power relation, power extracted, wind distribution and speed prediction, wind map of India; wind turbines and electric generators. fundamentals – types of machines and their characteristics, horizontal and vertical wind mills, elementary design principle, wind energy farms, off-shore plants; small, mini and micro hydro power plants and their resource assessment, plant layout with major components shown.

[T2][No. of hrs. 10]

UNIT- III

Other Non-conventional Energy Sources: biomass – photosynthesis and origin of biomass energy, resources, cultivated resources, waste to biomass, terms and definitions – incineration, wood and wood waste, harvesting super tree, energy forest, phyrolysis, thermo-chemical biomass conversion to energy, gasification, anaerobic digester, fermentation, gaseous fuel; geothermal – resources, hot spring, steam system, principle of working, site selection, associated problems in development; ocean and tidal energy – principle of ocean thermal energy conversion, wave energy conversion machines, problems and limitations, fundamentals of tidal power, conversion systems and limitations; hydrogen energy – properties of hydrogen, sources, production and storage, transportation, problems for use as fuel; fuel cells – introduction with types, principle of operation and advantages.

[T1,R2][No. of hrs. 12]

UNIT-IV

Grid Connectivity: wind power interconnection requirement - low-voltage ride through (LVRT), ramp-rate limitations, supply of ancillary services for frequency and voltage control, load following, reserve requirement, impact of connection on stead-state and dynamic performance of power system; interfacing dispersed generation of solar energy with the grid, protective relaying, islanding, voltage flicker and other power quality issues; role of non-conventional energy system in smart grid.

[T2,R3][No. of hrs. 10]

Text Books:

[T1] Tiwari and Ghosal, "Renewable Energy Resources: Basic Principle & Application", Narosa Pub.
[T2] S N Bhadra ,D, Kastha,'Wind Electrical Systems" Oxford Publication 2014

References Books:

[R2] John Twidell, "Renewable Energy Sources", Taylor and Francis
[R3] Godfrey Boyle, "Renewable Energy: Power for a Sustainable Future", Oxford University Press
[R4] Ewald F. Fuchs, "Power Conversion of Renewable Energy Systems", Springer
[R5] B. H. Khan, "Non Conventional Energy", Tata McGraw Hill
[R6] D P kothari ,"Wind energy System and applications" Narosa Pub 2014

RADAR AND NAVIGATION

	L	T/P	C
Paper Code: ETEC-419			
Paper: Radar and Navigation	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: To study the basic of radar systems and their use in different navigation systems.

UNIT I

Introduction to Radar: Basic Radar – The Origins of Radar, radar system (block diagrams), Radar range Equation, Applications of Radar. Radar types: MTI, Doppler and Pulse, PRF, Delay, Line Cancellers, Staggered Pulse Repetition Frequencies, Doppler Filter Banks, Digital MTI Processing, Moving Target Detector, Limitations to MTI Performance, Pulse Doppler Radar. Tracking with Radar-Monopulse Tracking, Conical Scan and Sequential Lobing, Limitations to Tracking Accuracy, Low-Angle Tracking - Tracking in Range, Comparison of Trackers, Automatic Tracking with Surveillance Radars.

[T1][R1][No. of Hrs. 11]

UNIT II:

Radar Receiver: Introduction, Superheterodyne Receiver, Receiver noise Figure, Duplexers and Receiver Protectors, Radar Displays. Matched Filter Receiver, Detection Criteria, Detectors, Automatic Detector, Integrators, Constant-False-Alarm Rate Receivers, The Radar operator, Signal Management, Propagation Radar Waves, Atmospheric Refraction, Standard propagation, Nonstandard Propagation, The Radar Antenna, Reflector Antennas, Electronically Steered Phased Array Antennas, Phase Shifters, Frequency-Scan Arrays

[T1][R1][R2][No. of Hrs. 11]

UNIT III

Radar Transmitters- Introduction –Linear Beam Power Tubes - Solid State RF Power Sources - Magnetron - Crossed Field Amplifiers - Other RF Power Sources – Other aspects of Radar Transmitter.

Detection of Signals in Noise –Detection of Signals in Noise, Receiver Noise and the Signal-to-Noise Ratio, Probability Density Functions, Probabilities of Detection and False Alarm, Integration of Radar Pulses, Radar Cross Section of Targets, Radar cross Section fluctuations, Transmitter Power.

[T2][R3][No. of Hrs. 11]

UNIT IV

Navigation – Introduction, Four methods of Navigation, Radio Direction Finding, The Loop Antenna, Loop Input Circuits, An Aural Null Direction Finder, The Goniometer, Errors in Direction Finding, Adcock Direction Finders, Direction Finding at Very High Frequencies, Automatic Direction Finders, The Commutated Aerial Direction Finder, Range and Accuracy of Direction Finders, Radio Ranges, Doppler Navigation, component, Beam Configurations, Track Stabilization, introduction to Satellite Navigation System, Global Positioning System(GPS).

[T1][R1][No. of Hrs. 11]

Textbooks:

[T1] Merrill I. Skolnik, "Introduction to Radar Systems", Tata McGraw-Hill (3rd Edition) 2003.
[T2] N.S.Nagaraja, "Elements of Electronic Navigation Systems", 2nd Edition, TMH, 2000.

Reference books:

[R1] Gottapu Sasi Bhushana Rao, "Microwave and RADAR Engineering". Pearson publication.
[R2] Peyton Z. Peebles, "Radar Principles", Johnwiley, 2004
[R3] J.C Toomay, "Principles of Radar", 2nd Edition –PHI, 2004

PROJECT MANAGEMENT

Paper Code: ETMS–421	**L**	**T/P**	**C**
Paper: Project Management	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objectives: The student is introduced to the concepts of project management which becomes back bone knowledge for an engineer to have a holistic view of executing a project.

UNIT – I

Introduction to Project management: Characteristics of projects, Definition and objectives of Project Management, Stages of Project Management, Project Planning Process, Establishing Project organization.

[T1,T2][No. of Hrs. 11]

UNIT –II

Work definition: Defining work content, Time Estimation Method, Project Cost Estimation and budgeting, Project Risk Management, Project scheduling and Planning Tools: Work Breakdown structure, LRC, Gantt charts, CPM/PERT Networks.

[T1,T2][No. of Hrs. 11]

UNIT – III

Developing Project Plan (Baseline), Project cash flow analysis, Project scheduling with resource constraints: Resource Leveling and Resource Allocation. Time Cost Trade off: Crashing Heuristic.

[T1,T2][No. of Hrs. 10]

UNIT – IV

Project Implementation: Project Monitoring and Control with PERT/Cost, Computers applications in Project Management, Contract Management, Project Procurement Management. Post-Project Analysis.

[T1,T2][No. of Hrs. 10]

Text Books:

[T1] Shtub, Bard and Globerson, Project Management: Engineering, Technology, and Implementation, Prentice Hall, India

[T2] P. K. Joy, Total Project Management: The Indian Context, Macmillan India Ltd.

Reference Books:

[R1] Cleland and King, VNR Project Management Handbook.

[R2] Lock, Gower, Project Management Handbook.

[R3] Wiest and Levy, Management guide to PERT/CPM, Prentice Hall. India

[R4] Horald Kerzner, Project Management: A Systemic Approach to Planning, Scheduling and Controlling, CBS Publishers.

[R5] S. Choudhury, Project Scheduling and Monitoring in Practice.

[R6] John M Nicholas, Project Management for Business and Technology: Principles and Practice, Prentice Hall, India.

[R7] N. J. Smith (Ed), Project Management, Blackwell Publishing.

[R8] Robert K. Wysocki, Robert Back Jr. and David B. Crane, Effective Project Management, John Wiley.

[R9] Jack R Meredith and Samuel J Mantel, Project Management: A Managerial Approach, John Wiley.

ECONOMICS FOR ENGINEERS

Paper Code: ETMS-423	**L**	**T/P**	**C**
Paper: Economics for Engineers	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to give the working engineer an overview of the economics principles often employed in effective engineering decisions as related to the designing, planning and implementation of successful civil engineering projects.

UNIT – I

Engineering economics and its definition, Nature and scope, Overview of Indian Financial Scenario.
Utility, Theory of demand, law of demand and its exceptions, Elasticity of demand, Law of supply and elasticity of supply, Determination of equilibrium price under perfect competition.
Time value of money-Simple and Compound Interest, Cash Flow Diagram, Principle of Economic Equivalence Evaluation of Engineering projects, Concept of Internal rate of return (IRR).

[T1,T2][No. of Hrs: 10]

UNIT – II

Cost Concepts, Elements of costs, Preparation of cost sheet, Segregation of costs into Fixed and variable costs, Break-even Analysis-Linear Approach.
Engineering Accounting, Manufacturing Cost, Manufacturing Cost Estimation, Preparing Financial Business Cases, Profit and loss A/c Balance sheet.
Asset Depreciation and its Impact on Economic Analyses, Depreciation Policy, Straight line method and declining balance method, Economic Justification of Asset Replacements.

[T1,T2][No. of Hrs: 12]

UNIT – III

Types of business ownership: Private ownership- individual, Partnership, Joint stock companies, Co-operative societies, State ownership-government departmental organization, Public corporations, Government companies, Public Private Partnership (PPP) and its management. Store keeping, Elements of Materials management and control polices. Banking: Meaning and functions of commercial banks, Function of Reserve Bank of India.

[T1,T2][No. of Hrs: 10]

UNIT - IV

Asset Depreciation and its Impact on Economic Analyses, Depreciation Policy, Straight line method and declining balance method, Economic Justification of Asset Replacements. Development of business case analyses for new product development projects and the impact of taxes on engineering economic decisions. Inflation and its impact on economy.

[T1,T2][No. of Hrs: 12]

Text Books:

[T1] Sullivan, Wicks, Koelling, "Engineering Economy", Pearson Education
[T2] S.C. Sharma and T.R. Banga, "Industrial organization and engineering economics"

References Books:

[R1] Riggs, Bedworth and Randhwa, "Engineering Economics", McGraw Hill Education India.
[R2] C. T. Horngreen, "Cost Accounting", Pearson Education India.
[R3] R. R. Paul, "Money banking and International Trade", Kalyani Publuisher, New-Delhi.
[R4] Engineering Economics by Tahir Hussain, University Science Press, 2010
[R5] Engineering Economics by Dr. Rajan Mishra – University Science Press, 2009
[R6] H.L. Ahuja, "Principle of Economics", S. Chand
[R7] Khan, Siddiquee, Kumar, "Engineering Economy" Pearson Education

GRID COMPUTING

Paper Code: ETIT-425	**L**	**T/P**	**C**
Paper: Grid Computing	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: To enable students to understand the basic concepts of GRID computing with performance issues, Web services, monitoring, optimization, security and resource management.

UNIT I

Fundamentals: Overview of Distributed Systems and it's variants like grid computing, cloud computing, Cluster Computing etc. Introduction to Grid Computing, it's components(Functional View, A Physical View, Service View), key issues and benefits, Characterization and Architecture of Grid, Grid - Types, Topologies, Components, Layers. Grid Computing Standards and Applications.

[T1,T2][No. of Hours: 11]

UNIT II

Web Services and Grid Monitoring : OGSA and WSRF : Overview, Services, Schema and architecture. Grid Monitoring Systems: Overview, architecture, GridICE, JAMM, MDS and Other monitoring Systems (Ganglia and GridMon), Grid portals.

[T1,T2][No. of Hours: 11]

UNIT III

Grid Security and Resource Management -
Grid Security: A Brief Security Primer, PKI, X509 Certificates, Grid Security-
Grid Scheduling and Resource Management: Scheduling Paradigms, Working principles of Scheduling, A Review of Condor, SGE, PBS and LSF-Grid Scheduling with QoS.

[T1,T2][No. of Hours: 11]

UNIT IV

Data Management and Grid Middleware-
Data Management: Categories and Origins of Structured Data, Data Management, Challenges, Database integration with grid, Architectural Approaches-Collective Data Management Services, Federation Services .
Grid Middleware: List of globally available Middlewares, Globus Toolkit.

[T1,T2][No. of Hours: 11]

Text Books:

[T1] Maozhen Li, Mark Baker, The Grid Core Technologies, John Wiley & Sons.
[T2] Joshy Joseph & Craig Fellenstein, "Grid Computing", Pearson 2004.
[T3] C.S. R. Prabhu ,"Grid and Cluster Computing', PHI 2014

Reference Books:

[R1] Ian Foster & Carl Kesselman, The Grid 2 – Blueprint for a New Computing Infrastructure, Morgan Kaufman – 2004.
[R2] Barry Wilkinson , "Grid Computing", CRC Press.
[R3] Joel M. Crichlow, "Distributed Systems – Computing over Networks", PHI, 2014.
[R4] RajKumar Buyya, "High Performance Cluster Computing – Volume I Architectures and Systems", Pearson, 2013.

PARALLEL COMPUTING

	L	T/P	C
Paper Code: ETCS-427			
Paper: Parallel Computing	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The perquisites are Computer Architecture, OS. The student is introduced to the concepts of parallelism which enhances the speed of operations of an OS. Further, various architectures of multiprocessor is taught.

UNIT I

Theory of Parallelism: Parallelism, Reason of parallel processing, Concepts and challenges, applications of parallel processing.

Parallel computer models: The state of computing, Classification of parallel computers, Flynn and Feng's classification, SIMD and MIMD operations, Shared Memory vs. message passing multiprocessors, Distributed shared memory, Hybrid multiprocessors, multiprocessors and multicomputers, Multivector and SIMD computers, PRAM and VLSI Models.

Program and Network Properties: Conditions of parallelism, program partitioning and scheduling, program flow mechanism, system interconnection architecture.

[T1,T2][No. of Hrs. 10]

UNIT II

Memory Hierarchy Design: Memory technologies and optimization, inclusion, coherence and locality, cache memory organization and cache performance optimization, shared memory organization, memory protection, virtual memory technology and introduction to buses, crossbar and multi-stage switches.

Pipelining and ILP: Instruction level parallelism and its exploitation- concepts and challenges, overcoming data hazards with dynamic scheduling. Pipelining, instruction and arithmetic pipelining designs, branch handling techniques, linear and non-linear pipeline processors, superscalar and super pipeline design.

[T1,T2][No. of Hrs. 10]

UNIT III

Parallel architectures: multi-processor system interconnects, cache coherence and synchronization mechanism, message passing mechanism, vector processing principles, multivector multiprocessors, compound vector processing, principles of multithreading, latency hiding techniques- shared virtual memory, prefetching techniques, distributed coherent cache, scalable and multithread architectures, dataflow and hybrid architecture.

[T1,T2][No. of Hrs. 10]

UNIT IV

Parallel Programming Platforms: Implicit Parallelism: Trends in Microprocessor Architectures, limitations of Memory System Performance, Dichotomy of Parallel Computing Platforms, Physical Organization of Parallel Platforms, Communication Costs in Parallel Machines, Routing Mechanisms for Interconnection Networks.

Parallel Programming Models: Shared variable models, message passing models, parallel languages and complier, code optimization and scheduling, Introduction of shared-memory MIMD machines and message-passing MIMD machines.

[T1,T2][No. of Hrs. 10]

Text Books:

[T1] Introduction to Parallel Computing by Ananth Grama, Anshul Gupta, George Karypis, Vipin Kumar, Pearson Publication.
[T2] Advance computer Architecture by Kai Hwang under Tata McGraw Hill publications.
[T3] Introduction to Parallel Processing: Algorithms and Architectures By Behrooz Parhami in Springer Shop.

Reference Books:

[R1] Introduction to Parallel Processing by P. Ravi Prakash, M. Sasikumar, Dinesh Shikhare By PHI
[R2] Fundamentals of Parallel Processing by Jordan Harry, Alaghband Gita, PHI Publication
[R3] Introduction to Parallel Programming by Steven Brawer.
[R4] Parallel Computers – Architecture and Programming by V. Rajaraman And C. Siva Ram Murthy.

SOCIOLOGY AND ELEMENTS OF INDIAN HISTORY FOR ENGINEERS

	L	T/P	C
Paper Code: ETHS-419			
Paper: Sociology and Elements of Indian History for Engineers	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks.

Objective: The objective of this course is to familiarize the prospective engineers with elements of Indian history and sociological concepts and theories by which they could understand contemporary issues and problems in Indian society. The course would enable them to analyze critically the social processes of globalization, modernization and social change. All of this is a part of the quest to help the students imbibe such skills that will enhance them to be better citizens and human beings at their work place or in the family or in other social institutions.

UNIT I

Module 1A: Introduction to Elements of Indian History: What is History? History Sources-Archaeology, Numismatics, Epigraphy & Archival research; Methods used in History; History & historiography.

[*3 Lectures*]

Module 1B: Introduction to sociological concepts-structure, system, organization, social institution, Culture social stratification (caste, class, gender, power). State & civil society.

[*7 Lectures*]

[T1][No. of Hrs. 10]

UNIT II

Module 2A: Indian history & periodization; evolution of urbanization process: first, second & third phase of urbanization; Evolution of polity; early states of empires; Understanding social structures-feudalism debate.

[*3 Lectures]*

Module 2B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[*7 Lectures*]

[T1][No. of Hrs. 10]

UNIT III

Module 3A: From Feudalism to colonialism-the coming of British; Modernity & struggle for independence.

[3 Lectures]

Module 3B: Understanding social structure and social processes: Perspectives of Marx, Weber & Durkheim.

[9 *Lectures*]

[T1][No. of Hrs. 12]

UNIT IV

Module 4A: Issues & concerns in post-colonial India (upto 1991); Issues & concerns in post-colonial India 2nd phase (LPG decade post 1991).

[*3 Lectures*]

Module 4B: Social change in contemporary India: Modernization and globalization, Secularism and communalism, Nature of development, Processes of social exclusion and inclusion, Changing nature of work and organization.

[*10 Lectures*]

[T1][No. of Hrs. 13]

Text Books:

[T1] Desai, A.R. (2005), Social Background of Indian Nationalism, Popular Prakashan.
[T2] Giddens, A (2009), Sociology, Polity, 6th Edition

Reference Books:

[R1] Guha, Ramachandra (2007), India After Gandhi, Pan Macmillan
[R2] Haralambos M, RM Heald, M Holborn, (2000), Sociology, Collins

SELECTED TOPICS IN ECE

	L	T/P	C
Paper Code: ETEC-429			
Paper: Selected Topics in ECE	**3**	**0**	**3**

INSTRUCTIONS TO PAPER SETTERS: **MAXIMUM MARKS: 75**

1. Question No. 1 should be compulsory and cover the entire syllabus. This question should have objective or short answer type questions. It should be of 25 marks.
2. Apart from Question No. 1, rest of the paper shall consist of four units as per the syllabus. Every unit should have two questions. However, student may be asked to attempt only 1 question from each unit. Each question should be of 12.5 marks

Objective: The objective of this course is to familiarize the selected vital topics of the electronics and communication engineering.

UNIT I

Introduction to the Verilog Hardware Description Language (HDL), Verilog system design , Module testing, Behaviour Modelling, Tasks and functions, Verilog structure, syntax and semantics, Identifier names, logic values and numbers, data types. Gate level modeling, Generating arrays of instances • Generating arrays of instances Dataflow modelling, Reset function design. Design of digital sequential modules. Examples - Bus design.

[T1,R2][No. of Hrs. 10]

UNIT II

Introduction to System Verilog, System Verilog extensions to Verilog data types, System Verilog enhanced procedural blocks, System Verilog coding styles for top-down design with synthesis and simulation. Blocking and non-blocking assignments affect, simulation and synthesis. Overview of RTL/gate/switch models. Writing verification test benches in Verilog. System verilog interfaces. Using interfaces to simplify inter-module connections, Specifying interface views (modports), using tasks and functions in interfaces

[T1,R2][No. of Hrs. 10]

UNIT III

Introduction to Smart Antenna Systems, Concept and benefits of smart antennas, Fixed weight beam forming basics, Detection and estimation of arrival angle, Adaptive beam forming. Tx-Rx Array processing. Spatial processing for wireless systems. Adaptive antennas. Beam forming networks. Digital radio receiver techniques and software radios. Coherent and non-coherent CDMA spatial processors. Dynamic re-sectoring. Range and capacity extension – multi-cell systems. Spatio – temporal channel models. Environment and signal parameters. Geometrically based single bounce elliptical model.

[T2,R1][No. of Hrs. 10]

UNIT IV

Optimal Spatial filtering – adaptive algorithms for CDMA. Multitarget decision – directed algorithm. DOA estimation – conventional and subspace methods. ML estimation techniques. Estimation of the number of sources using eigen decomposition. Direction finding and true ranging PL systems. Elliptic and hyperbolic PL systems. TDOA estimation techniques. Applications of Smart Antennas in Wireless/Mobile Communications Applications, Smart Antenna Techniques for CDMA (including current applications).

[T2,R1][No. of Hrs. 10]

Textbook:

[T1] SystemVerilog for Verification by Ben Cohen, Srinivasan Venkataramanan, Ajeetha Kumari
[T2] T.S.Rappaport & J.C.Liberti, Smart Antennas for Wireless Communication, Prentice Hall (PTR), 1999.

Reference Books:

[R1] R.Janaswamy, Radio Wave Propagation and Smart Antennas for Wireless Communication, Kluwer, 2001.
[R2] Verilog HDL: A Guide to Digital Design and Synthesis, by Samir Palnitkar Prentice Hall Professional, 2003

OPTICAL AND WIRELESS COMMUNICATION LAB

	L	T/P	C
Paper Code: ETEC-451			
Paper: Optical and Wireless Communication Lab	**0**	**2**	**1**

List of Experiments:

1. Setting up Fiber Optic Analog and Digital Link.
2. Study of Intensity Modulation Technique using Analog Input Signal.
3. Study of Intensity Modulation Technique using Digital Input Signal.
4. Frequency Modulation System.
5. Pulse width Modulation System.
6. Study of Propagation Loss in Optical Fiber.
7. Study of Bending Loss.
8. Measurement of Optical Power using Optical Power Meter.
9. D. C. Characteristics of PIN and APD photo diode.
10. Measurement of Numerical aperture and Propagation loss in optical fiber.

PSPICE SIMULATION

Operating characteristics of optical devices (LED and photodiode).
DC Characteristics of LED,PIN and APD Photo Diode

NOTE:- At least 8 Experiments out of the list must be done in the semester.

EMBEDDED SYSTEMS LAB

	L	T/P	C
Paper Code: ETEC-453			
Paper: Embedded Systems Lab	**0**	**2**	**1**

List of Experiments:

1. Introduction to microcontroller and interfacing modules.
2. To interface the seven segment display with microcontroller 8051
3. To create a series of moving lights using PIC on LEDs.
4. To interface the stepper motor with microcontroller.
5. To display character 'A' on 8*8 LED Matrix.
6. Write an ALP to add 16 bits using ARM 7 Processor
7. Write an ALP for multiplying two 32 bit numbers using ARM Processor
8. Write an ALP to multiply two matrices using ARM processor

NOTE:- At least 8 Experiments out of the list must be done in the semester.

BIOMEDICAL INSTRUMENTATION

Paper Code: ETEC-455	**L**	**T/P**	**C**
Paper: Biomedical Instrumentation	**0**	**2**	**1**

List of Experiments:

1. To study various transducers for biomedical applications
2. To study various functions of Bedside & Central Patient Monitoring Unit.
3. To measure blood pressure using Patient Monitoring Unit.
4. To study working principle & measure blood pressure using Sphygmomanometer.
5. To measure percentage amount of oxygenated arterial blood using Patient Monitoring Unit.
6. To measure ECG using Patient Monitoring Unit.
7. To measure body temperature using Patient Monitoring Unit.
8. To study working principle & measure body temperature using Digital Thermometer.

NOTE:- At least 8 Experiments out of the list must be done in the semester.

DATABASE MANAGEMENT SYSTEMS LAB

	L	T/P	C
Paper Code: ETEC-455			
Paper: Database Management Systems Lab	**0**	**2**	**1**

LAB BASED ON DBMS

Lab includes implementation of DDL, DCL, DML i.e SQL in Oracle.

List of Experiments:

1. Design a Database and create required tables. For e.g. Bank, College Database
2. Apply the constraints like Primary Key, Foreign key, NOT NULL to the tables.
3. Write a SQL statement for implementing ALTER, UPDATE and DELETE
4. Write the queries to implement the joins
5. Write the queries for implementing the following functions: MAX (), MIN (),AVG (),COUNT ()
6. Write the queries to implement the concept of Integrity constrains
7. Write the queries to create the views
8. Perform the queries for triggers
9. Perform the following operation for demonstrating the insertion, updation and deletion using the referential integrity constraints

TEXT BOOK:

1. SQL/ PL/SQL, The programming language of Oracle, Ivan Bayross, 4th Edition BPB Publications

NOTE:- At least 8 Experiments out of the list must be done in the semester.