

**ELECTRONICS AND COMMUNICATION ENGINEERING
COURSE STRUCTURE**

Course Code	Course Name	L	T	P	C
20ECX003	BIO-MEDICAL ENGINEERING	3	0	0	3

COURSE OUTCOMES:

After successful completion of this course, students should be able to

- CO1 : Distinguish and describe the Various bio electric potentials provoked by living system
- CO2 : Predict and produce the suitable transducer for bio medical application
- CO3 : Distinguish the cardio and respiratory instruments and its prosecution
- CO4 : Recognize the minor and major instruments in ICU and take curative steps
- CO5 : Apply the various electronics signals to know the structure of the body and convert the information of patient as image or Signal

SYLLABUS

UNIT-I : INTRODUCTION TO BIOMEDICAL INSTRUMENTATION

Age of Biomedical Engineering, Man Instrumentation System, Components of the Man-Instrument System, Physiological System of the Body, Problems Encountered in Measuring a Living System, Sources of Bioelectric Potentials, Muscle, Bioelectric Potentials, Sources of Bioelectric Potentials, Resting and Action Potentials, Propagation of Action Potential, Bioelectric Potentials-ECG, EEG and EMG.

UNIT-II : ELECTRODES AND TRANSDUCERS

Introduction, Electrode Theory, Biopotential Electrodes, Examples of Electrodes, Basic Transducer Principles, Biochemical Transducers, The Transducer and Transduction Principles, Active Transducers, Passive Transducers, Transducers for Biomedical Applications, Transducers with Digital Output.

UNIT-III : CARDIOVASCULAR SYSTEM AND RESPIRATORY SYSTEM

The Heart and Cardiovascular System, Electro Cardiography, Blood Pressure Measurement, Measurement of Blood Flow and Cardiac Output, Measurement of Heart Sound, Plethysmography, Pulse Sensors, The Physiology of The Respiratory System, Tests and Instrumentation for The Mechanics of Breathing, Respiration Sensor, Respiratory Therapy Equipment.

UNIT-IV : PATIENT CARE AND MONITORING

Elements of Intensive-Care Monitoring, Patient Monitoring Displays, Diagnosis, Calibration and Repair ability of Patient-Monitoring Equipment, Other Instrumentation for Monitoring Patients, Pacemakers, Defibrillators, Radio Frequency Applications of Therapeutic use. Physiological Effects and Electrical Current, Shock Hazards from Electrical. Equipment, Methods of Accident Prevention

UNIT-V : DIAGNOSTIC TECHNIQUES AND BIO-TELEMETRY

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Principles of Ultrasonic Measurement, Ultra sonic Imaging, Ultrasonic Applications of Therapeutic Uses, Ultrasonic Diagnosis, X-Ray and Radio-Isotope Instrumentations, CAT Scan, Emission Computerized Tomography, MRI, Introduction to Biotelemetry, Physiological Parameters Adaptable to Biotelemetry, The Components of Biotelemetry System, Implantable Units, Telemetry for ECG Measurements during Exercise, Telemetry for Emergency Patient Monitoring

Text Books:

1. "Bio-Medical Electronics and Instrumentation", Onkar N. Pandey, Rakesh Kumar, Katson Books.
2. "Bio-Medical Instrumentation", Cromewell ,Wiebell, Pfeiffer

References:

1. "Introduction to Bio-Medical Equipment Technology", 4th Edition, Joseph J. Carr, John M. Brown, Pearson Publications.
2. "Hand Book of Bio-Medical Instrumentation", Khandapur. McGrawHill



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DEPARTMENT OF INFORMATION TECHNOLOGY

SEMESTER -VII

Course Code	Course Name	L	T	P	C
20IT7E01	PROFESSIONAL ELECTIVE-III 1. MOBILE COMPUTING	3	0	0	3

Course Objectives:

- To study the emerging technologies in the context of wireless networks
- To understand the mobile computing environment
- To learn about pervasive computing environment

Course Outcomes:

At the end of the course, student will be able to

CO-1: Interpret Wireless local area networks (WLAN): MAC design principles, 802.11 WIFI

CO-2: Discuss fundamental challenges in mobile communications and potential Techniques in GSM

CO-3: Demonstrate Mobile IP in Network layer

CO-4: Elaborate TCP/IP Protocols and database issues

CO-5: Illustrate different data delivery methods and synchronization protocols

CO-6: Develop applications that are mobile-device specific and demonstrate current Practice in mobile computing contexts.

UNIT I

Mobile Communications: An Overview- Mobile Communication-guided transmission, unguided transmission- signal propagation frequencies, antennae, modulation, modulation methods and standards for voice-oriented data communication standards, modulation methods and standards for data and voice communication, mobile computing- novel applications and limitations, mobile computing architecture, mobile system networks. Mobile devices and systems: Cellular networks and frequency reuse, Mobile smart phones, Smart mobiles and systems, handheld pocket computers, Handheld devices, Smart systems, Limitations of mobile devices.

UNIT II

GSM and other 2G Architectures: GSM-services and system architecture, Radio interfaces of GSM, Protocols of GSM, Localization, Call handling, GPRS system architecture. Wireless medium access control, CDMA, 3G, 4G and 5G Communication: Modulation, Multiplexing, Controlling the medium access, Spread spectrum, Coding methods, IMT-2000/3G wireless communication standards, WCDMA/3G communication standards, CDMA 3G communication standards, Broadband wireless access, 4G networks, 5G Networks.

UNIT III

Mobile IP Network layer: IP and Mobile IP network layers: OSI layer functions, TCP/IP and Internet protocol, Mobile internet protocol; Packet delivery and Handover Management; Location Management: Agent Discovery; Mobile TCP Introduction to Mobile Adhoc network:



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fixed infrastructure architecture, MANET infrastructure architecture; MANET: properties, spectrum, applications; Security in Ad-hoc network; Wireless sensor networks; sensor network applications.

UNIT IV

Synchronization: Synchronization in mobile computing systems, Usage models for Synchronization in mobile application, Domain-dependent specific rules for data synchronization, Personal information manager, synchronization and conflict resolution strategies, synchronizer; Mobile agent: mobile agent design, aglets; Application Server.

UNIT V

Mobile Wireless Short Range Networks and Mobile Internet: Wireless networking and wireless LAN, Wireless LAN (WLAN) architecture, IEEE 802.11 protocol layers, Wireless application protocol (WAP)-WAP1.1 architecture, wireless datagram protocol (WDP), Wireless Transport Layer Security (WTLS), wireless transaction and session layers, wireless application environment.

Text Books:

- 1) Mobile Computing, 2nd edition, Raj kamal, Oxford, 2011
- 2) Mobile Computing, Technology Applications and Service Creation, 2nd Edition, Asoke K Talukder, Hasanahmed, Roopa R Yavagal, McGraw Hill, 2017

Reference Books:

- 1) "Principles of Mobile Computing," 2nd Edition, UWE Hansmann, LotharMerk, Martin S. Nocklous, Thomas Stober, Springer.2003

E-Resources:

- 1) <https://nptel.ac.in/noc/courses/noc16/SEM2/noc16-cs13/>

SEMESTER -VII

Course Code	Course Name	L	T	P	C
20IT7E07	SOFTWARE TESTING METHODOLOGIES	3	0	0	3

Course Objectives:

- To study fundamental concepts in software testing and discuss various software testing issues and solutions in software unit, integration, regression and system testing
- To learn how to plan a test project, design test cases and data, conduct testing, manage software problems and defects, generate a test report
- To expose the advanced software testing concepts such as object-oriented software testing methods, web-based and component-based software testing
- To understand software test automation problems and solutions
- To learn how to write software test documents and communicate with engineers in various forms

Course Outcomes:

By the end of the course, the student should have the ability to:

1. Identify and understand various software testing problems, apply software testing knowledge and engineering methods and solve these problems by designing and selecting software test models, criteria, strategies, and methods
2. Design and conduct a software test process for a software project
3. Analyze the needs of software test automation
4. Use various communication methods and skills to communicate with their teammates to conduct their practice-oriented software testing projects
5. Basic understanding and knowledge of contemporary issues in software testing, such as component-based, web based and object oriented software testing problems
6. Write test cases for given software to test it before delivery to the customer and write test scripts for both desktop and web based applications

UNIT I

Software Testing: Introduction, Evolution, Myths & Facts, Goals, Psychology, definition, Model for testing, Effective Vs Exhaustive Software Testing. Software Testing Terminology and Methodology: Software Testing Terminology, Software Testing Life Cycle, Software Testing Methodology. Verification and Validation: Verification & Validation Activities, Verification, Verification of Requirements, High level and low level designs, verifying code, Validation

UNIT II

Dynamic Testing-Black Box testing techniques: Boundary Value Analysis, Equivalence class Testing, State Table based testing, Decision table based testing, Cause-Effect



Graphing based testing, Error guessing.

White-Box Testing: need, Logic Coverage criteria, Basis Path testing, Graph matrices, Loop testing, data flow testing, mutation testing

UNIT III

Static Testing: Inspections, Structured Walkthroughs, Technical Reviews Validation activities: Unit testing, Integration Testing, Function testing, system testing, acceptance testing

Regression testing: Progressives Vs regressive testing, Regression test ability, Objectives of regression testing, Regression testing types, Regression testing techniques

UNIT IV

Efficient Test Suite Management: growing nature of test suite, Minimizing the test suite and its benefits, test suite prioritization, Types of test case prioritization, prioritization techniques, measuring the effectiveness of a prioritized test suite Software Quality Management: Software Quality metrics, SQA models

Debugging: process, techniques, correcting bugs.

UNIT V

Automation and Testing Tools: need for automation, categorization of testing tools, selection of testing tools, Cost incurred, Guidelines for automated testing, overview of some commercial testing tools such as Win Runner, Load Runner, Jmeter and JUnit. Test Automation using Selenium tool.

Testing Object Oriented Software: basics, Object oriented testing Testing Web based Systems: Challenges in testing for web based software, quality aspects, web engineering, testing of web based systems, Testing mobile systems

Text Books:

- 1) Software Testing, Principles and Practices, Naresh Chauhan, Oxford.
- 2) Software Testing- Yogesh Singh, CAMBRIDGE.

Reference books:

- 1) Foundations of Software testing, Aditya P Mathur, 2ed, Pearson.
- 2) Software testing techniques – Baris Beizer, Dreamtech, second edition.
- 3) Software Testing, Principles, techniques and Tools, M G Limaye, TMH
- 4) Effective Methods for Software testing, Willian E Perry, 3ed, Wiley

e-Resources:

- 1) https://www.tutorialspoint.com/software_testing_dictionary/test_tools.htm

SEMESTER -VII

Course Code	Course Name	L	T	P	C
20IT7E10	BLOCK CHAIN TECHNOLOGIES AND APPLICATIONS	3	0	0	3

Course Objectives:

By the end of the course, students will be able to

- Understand how block chain systems (mainly Bit coin and Ethereum) work and to securely interact with them,
- Design, build, and deploy smart contracts and distributed applications
- Integrate ideas from block chain technology into their own projects.

Course Outcomes:

CO-1: At the end of the course, student will be able to

CO-2: Demonstrate the foundation of the Block chain technology and understand the processes in payment and funding.

CO-3: Identify the risks involved in building Block chain applications.

CO-4: Review of legal implications using smart contracts.

CO-5: Choose the present landscape of Blockchain implementations and Understand Cryptocurrency markets

CO-6: Examine how to profit from trading crypto currencies.

Unit-1: Introduction

Introduction, Scenarios, Challenges Articulated, Blockchain, Blockchain Characteristics, Opportunities Using Blockchain, History of Blockchain.

Evolution of Blockchain : Evolution of Computer Applications, Centralized Applications, Decentralized Applications, Stages in Blockchain Evolution, Consortia, Forks, Public Blockchain Environments, Type of Players in Blockchain Ecosystem, Players in Market.

Unit-2:Blockchain Concepts

Blockchain Concepts: Introduction, Changing of Blocks, Hashing, Merkle-Tree, Consensus, Mining and Finalizing Blocks, Currency aka tokens, security on blockchain, data storage on blockchain, wallets, coding on blockchain: smart contracts, peer-to-peer network, types of blockchain nodes, risk associated with blockchain solutions, life cycle of blockchain transaction.

Unit-3:Architecting Blockchain solutions

Architecting Blockchain solutions: Introduction, Obstacles for Use of Blockchain, Blockchain Relevance Evaluation Framework, Blockchain Solutions Reference Architecture, Types of Blockchain Applications.

Cryptographic Tokens, Typical Solution Architecture for Enterprise Use Cases, Types of



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Blockchain Solutions, Architecture Considerations, Architecture with Blockchain Platforms, Approach for Designing Blockchain Applications.

Unit-4: Ethereum Blockchain Implementation

Ethereum Blockchain Implementation: Introduction, Tuna Fish Tracking Use Case, Ethereum Ecosystem, Ethereum Development, Ethereum Tool Stack, Ethereum Virtual Machine, Smart Contract Programming, Integrated Development Environment, Truffle Framework, Ganache, Unit Testing, Ethereum Accounts, MyEtherWallet, Ethereum Networks/Environments, Infura, Etherscan, Ethereum Clients, Decentralized Application, Metamask, Tuna Fish Use Case Implementation, OpenZeppelin Contracts

Unit-5: Prospects of Blockchain

Blockchain prospering our world, Blockchain transforming business and professionalism, Discussing practical use-cases of blockchain, How can we take Aadhaar Card on blockchain, How blockchain can be used to remove corruption, Real case scenarios of Blockchain, Blockchain in Banking System, Blockchain in Land Registry, Blockchain in Capital Market Use cases for government

Text Books:

- 1) Ambadas, Arshad Sarfarz Ariff, Sham "Blockchain for Enterprise Application Developers", Wiley
- 2) Andreas M. Antonopoulos, "Mastering Bitcoin: Programming the Open Blockchain", O'Reilly.

Reference Books:

- 1) Blockchain: A Practical Guide to Developing Business, Law, and Technology Solutions, Joseph Bambara, Paul R. Allen, McGraw Hill.
- 2) Blockchain: Blueprint for a New Economy, Melanie Swan, O'Reilly.

e-Resources:

- 1) <https://github.com/blockchainedindia/resources>

DEPARTMENT OF MECHANICAL ENGINEERING				
Course code	OPEN ELECTIVE	C	L	P
20ME7001	OPTIMIZATION TECHNIQUES	3	3	0

Course Objectives:

The objective of the course is to understand the availability of resources and constraints in an industry and optimize them through the applications of appropriate resource management tools.

Course Outcomes:

After studying the course, the students are able to

1. Formulate the resource management problems and identify appropriate methods to solve them
2. Apply LPP, transportation and assignment models to optimize the industrial resources
3. Solve decision theory problems through the application of game theory
4. Apply the replacement and queuing models to increase the efficiency of the system
5. Model the project management problems through CPM and PERT

UNIT – I

Development – definition– characteristics and phases – operation research models – applications.

LINEAR PROGRAMMING: problem formulation – graphical solution – simplex method – artificial variables techniques –(Graphical & Simplex methods only).

UNIT – II

TRANSPORTATION PROBLEM: Formulation – optimal solution, balanced & unbalanced transportation problem (North-West, Least cost and VAM only) – degeneracy, assignment problem – formulation – optimal solution - variants of assignment problem- traveling salesman problem.

UNIT – III

SEQUENCING – Introduction – flow –shop sequencing – n jobs through two machines – n jobs through three machines and two jobs through m -machines only.

UNIT – IV

THEORY OF GAMES: Introduction to decision theory – mini. max (max. mini) – criterion and optimal strategy – solution of games with saddle points – rectangular games without saddle points – 2×2 games – dominance principle – $m \times 2$ & $2 \times n$ games -graphical method.

UNIT – V

Network Analysis: Project planning, scheduling and controlling – tools for project management – critical path method (CPM) – programme evaluation and review technique (PERT) – cost analysis and crashing – resource leveling – updating.

TEXT BOOKS:

1. Operations Research-An Introduction/Hamdy A Taha/Pearson publishers
2. Operations Research –Theory & publications / S.D.Sharma-Kedarnath/McMillan publishers India Ltd

REFERENCES:

1. Introduction to O.R/Hiller & Libermann/TMH
2. Operations Research /A.M.Natarajan,P.Balasubramani,A. Tamilarasi/Pearson Education.
3. Operations Research: Methods & Problems / Maurice Saseini, Arthur Yaspan & Lawrence Friedman/Wiley
4. Operations Research / R.Pannerselvam/ PHI Publications.
5. Operations Research / Wagner/ PHI Publications.

Course Code: 20SH7E01

Course Name: Entrepreneurship Development

L	T	P	C
3	0	0	3

Course objective:

The aim of this course is to develop and strengthen entrepreneurial quality and motivation among students. This course will impart the basic entrepreneurial skills and understandings to run a business efficiently and effectively.

Course outcomes: Upon completing this course, students are able to

CO1: To gain knowledge on Entrepreneurship and attain skills to become an entrepreneur.

CO2: To attain the competency of preparing business plans and marketing plans.

CO3: To get awareness on different financial institutions that support entrepreneurs.

CO4: To know the various financial sources in establishing a venture

CO5: To get awareness on various contemporary aspects of social entrepreneurship.

UNIT I

Entrepreneurship: Concept, knowledge and skills requirement; Types of entrepreneurs, characteristic of successful entrepreneurs; role of entrepreneurship in economic development; entrepreneurship process; factors impacting emergence of entrepreneurship.

UNIT-2

Business Plan: Meaning, Purpose and Contents of a Business Plan; Business Planning Process - Methods of generating business ideas, Creative problem solving, opportunity recognition.

Marketing Plan: Marketing Research – Need and Significance; Industry Analysis; Competitor Analysis; Marketing Mix; Market Segmentation, Target Markets, Market Positioning;

UNIT-3

Institutions supporting Entrepreneurs: A brief overview of financial institutions in India - Central level and state level institutions - SIDBI - NABARD - IDBI - SIDCO - Indian Institute of Entrepreneurship - DIC - Single Window - Latest Industrial Policy of Government of India.

UNIT-4

Financial Aspects of Entrepreneurship: Need and sources of finance, Venture capital, Nature and Overview; Locating venture capitalists; Venture capital process; Incubation centers.

UNIT-5

Social entrepreneurship - Rural entrepreneurship, MSME Policies. Make-In India, Start-Up India, Stand-Up India, Woman Entrepreneurship.

Text Books:

01. B. Janakiram, M. Rizwana, Entrepreneurship Development text & cases, ExcelBooks, New Delhi, 2011..
02. D. F Kuratko, T.V. Rao, Entrepreneurship – A south – Asian Perspective, Cengage Learning 2012.
03. Rajeew Roy, Entrepreneurship, Oxford University Press, 2010.
04. G.Shainesh Philip Kotler, Kevin lane Keller, Alexander Chernev, Jagdish N. Sheth, Marketing Management, 16th Edition, Pearson Education.
05. Michael E. Porter, Competitive Strategy: Techniques for Analyzing Industries and Competitors, Free Press; Illustrated edition
06. Richard Roberts, Finance for Small and Entrepreneurial Business, Routledge

Reference books:

01. S. S. Khanka, Entrepreneurial Development, S Chand & Company.
02. S A Kumar, S C Poornima, M K Abraham, K Jayshree, Entrepreneurship Development, New Age International Pvt Ltd
03. C. Paramasiva, T. Subramanian, Financial Management, New Age Publications