RASHTRASANT TUKODOJI MAHARAJ NAGPUR UNIVERSITY

B. Tech. Semester-III (Electronics and Telecommunication/Electronics and Communication/Electronics Engineering-Major) (NEP)

SN	Course Category	Course Code	Name of Course	BoS	Teaching Scheme (hrs.)			Total Credit	Examination Scheme						
									Theory				Practical		
					(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	PCC-II	BET3T09	Electronics Devices and Circuits	ETRX	3	-	-	3	3	70	30	45	-	-	-
2	PCC-II	BET3P09	Electronics Devices and Circuits	ETRX	-	-	2	1	-	-	-	-	25	25	25
3	PCC-III	BET3T10	Digital System Design with HDL	ETRX	3	-	-	3	3	70	30	45	-	-	-
4	PCC-III	BET3P10	Digital System Design with HDL lab	ETRX	-	-	2	1	-	-	-	-	25	25	25
5	MDM-I	BMD3T01	Operating System		2	-	-	2	3	70	30	45	-	-	-
6	OE-I	BOE3T01	Open Elective-I Refer OE Basket		3	-	-	3	3	70	30	45	-	-	-
7	OE-I	BOE3P01	Open Elective-I Refer OE Basket		-	-	2	1	-	-	-	-	25	25	25
8	HSSM-I	BHM3T01	Entrepreneurship in Electronics Engineering	ASH	2	-	-	2	3	70	30	45	-	-	-
9	VEC-I	BVE3T01	Constitution of India	ASH	2	-	-	2	3	70	30	45	-	-	-
10	CEP	BCE3P01	Community Engineering Project	ETRX	-	-	4	2	-	-	-	-	-	100	50
			Total		15	-	10	20		420	180		75	175	

Open Elective-I:

1. Sensors and Actuators (for other departments)

MDM-I:

1. Operating System

Dr. N. G. Bawane.

Dr. S. L. Badjate.

Dr. P. Khandait.

Dr. R. D Raut

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR

FACULTY OF SCIENCE & TECHNOLOGY

B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week		
Total Credit:3	Lecture(L):3 Hrs	Tutorial/Activity(T/A): 0Hr.	
Subject Code	BET3T09	Electronics Devices and Circuits	
Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Outcomes	
After completion of syllabus , students would be able to	
1	Analyze the transistor circuits for different configurations.
2	Design transistor circuit with suitable biasing and stabilization techniques.
3	Analyze the JFET and MOSFET for different configuration.
4	Analyze the effect of feedback on gain and frequency of amplifier and oscillator.
5	Analyze power amplifier circuits.

SYLLABUS

Unit-1 Bipolar Junction Transistors: (7Hours)

Bipolar Junction Transistors: Physical structure and operation modes, Active region operation of transistor, DC analysis of transistor circuits, Ebor-Moll model, Current voltage characteristics of CE, CB, CC configuration Transistor as an amplifier, Transistor as a switch.

Unit 2: Transistor Biasing Techniques: (8Hours)

Transistor Biasing, The Operating Point, Bias Stability, Self-Bias, Fixed bias, collector to base bias, Emitter feedback bias, Stabilization against Variations in Ico, VBE, AND β, Collector-Current Stability, Thermal Runaway

Unit 3: MOSFET and Biasing Techniques: (7Hours)

Field-effect Transistors -The Junction Field-effect Transistor, The Pinch-off Voltage, The JFET Volt-Ampere Characteristics of the MOSFET, Small Signal Equivalent Model, MOSFET Amplifiers: Common Source, Common Drain and Common Gate Amplifiers.

Unit4: Feedback Amplifiers and Oscillators: (7Hours)

Feedback Amplifier: The General Feedback Structure, Various properties of Negative and positive Feedback, The Four Basic Feedback Topologies.

Oscillator: R-C phase shift oscillator, Wien Bridge oscillator, Crystal oscillator

Unit-5: Power Amplifier: (7Hours)

Power Amplifier: Class A, Class B, Class AB and Class C, Class D. Power Efficiency, Power Dissipation, Cross- Over Distortion in Class AB Circuits, Class A Transformer Coupled Power Amplifier, and Harmonic Distortion due to Large Signal operation.

Text/Reference Books:

1. Sedra Smith, Microelectronics Circuits, 5thEdition 2010-01-07, Oxford Uni. Press.
2. MillMan Halkias, Integrated Electronics, 7th edition 2009, Tata McGraw Hills.
3. Electronic Devices and Theory, BoyleStad, Nashelsky, 9th. Edition May 2010, PHI.
4. Electronic Devices and Circuits, S Salivahanan, N Suresh Kumar, 3rd Edition, Tata McGraw Hills.

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FACULTY OF SCIENCE & TECHNOLOGY

B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week	
Total Credit:1	Practicals:2 Hrs	Tutorial/Activity(T/A):0Hr.
Subject Code	BET3P09	Electronics Devices and Circuits

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	Hours

Course Outcomes	
After completion of syllabus , students would be able to	
1	Analyze the transistor circuits for different configurations.
2	Design transistor circuit with suitable biasing and stabilization techniques.
3	Analyze the JFET and MOSFET for different configuration.
4	. Analyze the effect of feedback on gain and frequency of amplifier and oscillator.
5	. Analyze power amplifier circuits.

List of Experiments	
1.	I/P & O/P Characteristics of Common Base Transistor
2.	I/P & O/P Characteristics of Common Emitter Transistor Configuration
3.	Design of Self Bias Circuit
4.	Determination of h-parameters of transistor from CE characteristics
5.	Obtain Frequency Response of single stage CE Amplifier
6.	Drain and Transfer characteristics of Field Effect Transistor (FET)
7.	Drain and Transfer characteristics of Metal Oxide Semiconductor Field Effect Transistor (MOSFET)
8.	The frequency response of Common Source MOSFET amplifier.
9.	Design of RC Phase Shift Oscillator
10.	Design of Wein Bridge Oscillator

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B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week	
Total Credit:3	Lecture(L):3 Hrs	Tutorial/Activity(T/A):0Hr.
Subject Code	BET3T10	Digital System Design with HDL

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Outcomes	
After completion of syllabus , students would be able to	
1	Compare and contrast different FPGA and CPLD architectures.
2	Design, develop and analyze combinational circuits.
3	Design, develop and analyze sequential circuits.
4	Implement digital system using CAD tool
5	Design, develop and analyze Behavioral Modeling of Sequential & Parallel Blocks and state machines

SYLLABUS

Unit-1 Digital Design Fundamentals: (8Hours)
Combinational & Sequential design issues, Introduction to finite state machines, Moore & Mealy Machine, Introduction to programmable devices, PLA, PAL, PROM, Structure of CPLDs, Introduction to FPGA, Architecture, CLB, IOB, Programmable Interconnect Points, Different type of programmable switches used in PLDs

Unit 2: HDL Design Methodologies: (7Hours)
Requirements of HDL, Design Methodologies, Different Modeling styles, Introduction to Verilog, Elements of Verilog, Verilog Module definition, Elements of Module

Unit 3 Introduction to Verilog: (8Hours)
Basic Concepts in Verilog, Reserved Keywords, Syntax & Semantics, Comments, Identifiers, Number Representation, System Representation, Verilog Ports, Verilog Data Types, Wire & Variables, Physical & Abstract, Constants, Parameter, Verilog Data Operators, Design entry in Verilog & Test bench, Compilation and synthesis, Timing analysis.

Unit4: Data Flow Modeling: (6 Hours)
Delay, Continuous Assignment, Delayed Continuous assignment, Structural Modeling, Feature, Module Instantiation, Gate level Primitives, Gate Delays, Switch Level Primitives, User Defined Primitives

Unit-5: Behavioral Modeling: (7 Hours)
Initial, Always, Procedural Assignment, Blocking and Non-Blocking assignments, Sequential & Parallel Blocks, Race around Condition, Timing Control, Procedural Statements, Conditional Statements if case loop repeat forever etc, Zero Delay Control, Event Based Timing Control,

Compiler Directives, Assign De-assign, Force Release, Latch Models, FF Models, State Machine Coding, Moore and Mealy Machines

Text Books:

1. Verilog Digital System Design" Zainalabedin Navabi Second Edition, Tata McGraw, Hill, 2009.
2. Verilog HDL : A Guide to Digital Design and Synthesis Samir Palnitkar 2nd Edition , Prentice Hall India, 2003.

Reference Books:

1. A Verilog HDL Primer"J. Bhaskar, 2nd Edition, Star Galaxy Press 1997.

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FACULTY OF SCIENCE & TECHNOLOGY

B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week	
Total Credit:1	Practical(P):2 Hrs	Tutorial/Activity(T/A):0Hr.
Subject Code	BET3P10	Digital System Design with HDL

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	Hours

Course Outcomes	
After completion of syllabus , students would be able to	
1	Compare and contrast different FPGA and CPLD architectures.
2	Design, develop and analyze combinational circuits.
3	Design, develop and analyze sequential circuits.
4	Implement digital system using CAD tool.
5	Design, develop and analyze Behavioral Modeling of Sequential & Parallel Blocks and state machines

List of Experiments	
1.	Study and design the equation z= ax+by+cxy by using Gate Level Modeling
2.	Study and design the equation z= ax+by+cxy by using Operators of VERILOG
3.	Study and design the equation z= ax+by+cxy by using UDP
4.	Design Verilog Module for D Flip-Flop, T-FF , SR FF and J-K FF
5.	Design Verilog Module for PIPO, PISO, SISO and SIPO Shift Register
6.	Design Verilog Module for Binary and BCD Counters
7.	Design Verilog Module for detection of Sequence (1101) by Moore FSM
8.	Design Verilog Module for detection of Sequence (1011) by Mealy FSM.
9.	Design Verilog Module for 4 bit Adder
10.	Design Verilog Module for 4 bit Adder Subtractor

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B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week		
Total Credit:2	Lecture(L):2 Hrs	Tutorial/Activity(T/A): 0Hr.	
Subject Code	BMD3T01	Operating System	
Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Outcomes	
After completion of syllabus , students would be able to	
1.	Explain basic concepts of operating system
2.	Understand the process management policies and scheduling algorithms
3.	Design various memory management techniques
4.	Analyze process synchronization techniques.
5.	Evaluate deadlock detection and prevention mechanism

SYLLABUS

Unit 1: **Introduction:** **(06)**

Evolution of OS, Types of OS, Basic hardware support necessary for modern operating systems, services provided by OS, system programs and system calls, OS structures: Layered, Monolithic, Microkernel, disk space management, and space allocation strategies, disk arm scheduling algorithms

Unit 2: **Process Scheduling:** **(06)**

Process Concepts, Process control block, types of schedulers, context switch, threads, multithreading model, goals of scheduling, and different scheduling algorithms, examples from Windows 2000 and Linux

Unit 3: **Memory Management:** **(06)**

Contiguous allocation, Relocation, Paging, Segmentation with paging, demand paging, paging, paging faults and instruction restart, page replacement algorithms, working sets, Locality, Thrashing, Garbage collection.

Unit 4: **Process cooperation and synchronization:** **(06)**

Concurrency Conditions, Critical section problems, software and hardware solutions,

Semaphores, conditional critical regions and monitors, classical inter process communication problems.

Reference:

Textbooks:

1. Operating system Concepts (8th edition) by Silberschatz, Peter B Galvin, and Greg Gagne, Willey Indian Edition 2010.
2. Modern Operating system (third edition) by Andrew s Tanenbaum, Prentice Hall of India (2008)
3. Operating systems by D. M. Dhamdhere, Tata McGraw Hill, 2nd Edition
4. Operating systems, 3rd edition by A. Godbole, TMH

publications Reference Books:

1. Operating systems (5th Edition), Internal and Design principles by Williams stallings, Prenctice Hall India, 2000
2. Operating systems: Concepts and Design by Milan Milenkovik, McGraw Hill Higher Education
3. Operating System (3rd Edition) b Garry Nut, Pearson Education
4. Operating system, 3rd edition by P Balkrishna Prasad, SciTech Publication

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FACULTY OF SCIENCE & TECHNOLOGY

B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week		
TotalCredit:3	Lecture(L):3 Hrs	Tutorial/Activity(T/A):0Hr.	
Course Code	BOE3T01	Course Name: Sensors and Actuators	
Examination Scheme			
Internal Marks (CIE) :	University Marks (SEE) :	Minimum Passing Marks:	Examination Duration:
30Marks	70Marks	45Marks	3 Hours

Course Outcomes	
After completion of syllabus, students would be able to	
1	Understand the terminology of Instrumentation and analyze various sensors.
2	Understand temperature sensors for measurements
3	Analyze various measurements techniques of transducers
4	Understand the role of Signal Conditioning in instrumentation
5	Understand working principles of actuators

SYLLABUS

Unit-1: Introduction (6 Hours)
Introduction to Electronics Measurement and Instrumentation: Transducers and sensors- Accuracy and precisions, types of errors, statistical analysis, probability of errors, limiting errors, sensitivity, linearity, hysteresis, resolution, reproducibility, transfer function.

Unit2: Temperature Sensors (7 Hours)
Resistance Vs Temperature characteristics for different materials, Thermistors, Thermocouples - thermoelectric effects for thermocouples, thermocouple tables, RTD, Other Thermal Sensors.

Unit3: Pressure Transducers (7 Hours)
Pressure, force, displacement and weight measurement: Capacitive and inductive transducers, Displacement Sensor (LVDT), Strain Sensors – strain gauges, its principle, applications, types of strain gauges, Load cells, Piezo-electric sensors, Motion sensors.

Unit4: Analog &Digital Signal Conditioning: (8 Hours)
Signal conditioning, Loading effects, Bridges for measurement techniques Digital measuring techniques, Sample and Hold Circuits, Comparator, Buffers, D/A Conversion and A/D Conversion, Weighted Resistor DAC, R-2R ladder DAC, Dual Slope, Parallel comparator Successive Approximation ADC techniques, Single channel and multi-channel Data Acquisition System (DAS).

Unit-5: Actuators: (8 Hours)
Pneumatic Hydraulic system: Control valves, cylinder, rotary actuators, Mechanical actuating system: Types of Motion, Kinematics chains, Cams, Gear trains, Belts and chain drives, Electrical actuating systems: Solid-state switches, Solenoids, D.C. motors, AC motors, Stepper motors,

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B.TECH.(Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week	
TotalCredit:1	Practicals:2Hrs	Tutorial/Activity(T/A):0Hr.
Course Code	BOE3P01	Sensors and Actuators Lab

Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
25Marks	25Marks	25Marks	--

Course Outcomes	
After completion of syllabus, students would be able to	
1	Understanding the relationship between physical variables (such as light, temperature, pressure, etc.) and electrical signals
2	Learn how LDRs change resistance based on the intensity of light
3	Understand how thermistors work by measuring temperature through resistance change.
4	Practical experience with the Arduino Uno will provide skills for building real-world systems and interfacing with sensors and actuators.
5	Learn the basic principles of hydraulic and pneumatic actuators, including how they use fluid pressure to create movement.

SN	List of Experiment
1	To study basics of sensors and transducers.
2	To study Light Dependent Resistors sensor
3	To study Temperature measurement with THERMISTOR
4	To study of Rainfall Detector Alarm using 555 Timer & Rain Sensor.
5	To study Object Detection Using Ultrasonic Sensor.
6	To study of Clap Switch using condenser mic.
7	To study of Arduino Uno
8	To determine the capacitance of an unknown capacitor using wien bridge.
9	To design Opamp as precision Half Wave Rectifier and plot the waveform.
10	To design Opamp as integrator and differentiator and plot the waveform.
11	To study voltage to current converter for converting 0-10V DC.
12	To study hydraulic, pneumatic actuators

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FACULTY OF SCIENCE & TECHNOLOGY

B.TECH. (Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week		
Total Credit:2	Lecture(L):2 Hrs	Tutorial/Activity(T/A):0Hr.	
Course Code	BHM3T01	Course Name: Entrepreneurship in Electronics Engineering	
Examination Scheme			
Internal Marks (CIE) :	University Marks (SEE):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Outcomes	
After completion of syllabus, students would be able to	
1	Describe the term entrepreneur and delineate the types and functions of entrepreneur
2	Explain the factors that affect entrepreneurial growth and entrepreneurial motivation.
3	Highlight the various business opportunities for the prospective entrepreneurs of the country
4	Exemplify how E-commerce is suitable for small enterprises and identify the challenges of E-commerce

SYLLABUS

Unit 1: Concept of entrepreneurship (6Hours)
Concept of entrepreneur, Characteristics and types of entrepreneurs, functions of entrepreneur, need for entrepreneur, women and social entrepreneur, difference between entrepreneur and manager.

Unit 2: Factors affecting entrepreneurship (6Hours)
Factors affecting entrepreneurship, theories of entrepreneurial motivation, entrepreneurial motivation factors, achievement motivation, government support system to develop entrepreneurship.

Unit 3: Start-up (6Hours)
Business opportunities in various sectors, identification of business opportunity, setting up a small business enterprise, preparation of business plan, errors in business plan formulation, causes of start-up failure.

Unit 4: Electronic Commerce and small Enterprise (6Hours)
Meaning of E-commerce, evolution and growth of E-commerce, advantages and disadvantages of E-commerce, challenges in E-commerce, contribution of digitalization in the economic growth of country

Text Books:

1. "Entrepreneurial Development" By, S.S.Khanka S.Chand & Co. Ltd. Ram Nagar New Delhi, 1999.
2. Essentials of Management: An International, Innovation and Leadership perspective by Harold Koontz, Heinz Weihrich McGraw Hill Education, 10 thEdition 2016. ISBN-978-93-392-2286-4

3. Modern Economic Theory By, K.K. Dewett. S.Chand.
4. Industrial Economics. By, Jagdish Sheth, Pearson Publication.
5. Hisrich R D and Peters M P, "Entrepreneurship" 5th Edition Tata McGraw-Hill, 2002.

Reference book:

1. Management of Entrepreneurship. By, N.V.R. Naidu, I.K. International Pvt Ltd.
2. Business Economics. By, K.Rajgopalchar. Atalantic Publishers.
3. Microeconomics. By, Robert Pindyk
4. Business Economics. By, H.L. Ahuja,H. L. Ahuja,Louis Prof. De Broglie. S.Chand.
5. Rabindra N. Kanungo "Entrepreneurship and innovation", Sage Publications, New Delhi, 1998.

Financing Small Scale Industries in India, By, K.C.Reddy.Himalaya Publication

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FACULTY OF SCIENCE & TECHNOLOGY

B.TECH. (Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester :III	Total Hours Distribution per week		
TotalCredit:2	Lecture(L):2 Hrs	Tutorial/Activity(T/A):0Hr.	
Course Code	BVE3T01	Course Name: Constitution of India	
Examination Scheme			
Internal Marks (CIE) :	University Marks (SEE) :	Minimum Passing Marks:	Examination Duration:
30Marks	70Marks	45Marks	3 Hours

Course Outcomes	
After completion of syllabus, students would be able to	
1	Analyze the basic structure of Indian Constitution
2	Remember the Fundamental rights and duties.
3	Know DPSP's and Nation's political structure
4	Understand function of Parliament and Judiciary.

SYLLABUS

Unit-1: Historical Background to the Framing of the Indian Constitution:
Introduction to the Indian Constitution, Preamble of the Indian Constitution and key concepts, Salient features of the Indian Constitution, Role and objective of Constituent Assembly.

Unit-2: Fundamental Rights and Duties
Fundamental rights meaning, significance, restrictions and limitations Fundamental duties and its scope, difference between Fundamental rights and Fundamental duties.

Unit-3: Directive Principles of State Policy
Directive Principles of State Policy (DPSP's) and its present relevance in India, Union Executive- President, Prime Minister and Union cabinet.

Unit-4: Central Legislature Executive and Higher Judiciary
Parliament - role and function, Lok Sabha and Rajya Sabha, Judiciary system in India, Supreme Court of India and other courts.

Text Books

1. Introduction to the Constitution of India by D D Basu.
2. Outlines of Indian Legal and Constitutional History by M P Jain.
3. Constitution of India by P M Bakshi

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FACULTY OF SCIENCE & TECHNOLOGY

B.TECH. (Electronics and Telecommunication/Electronics and communication/Electronics Engineering)

Semester: III	Total Hours Distribution per week		
Total Credit:2	Practical(P):4 Hrs	Tutorial/Activity(T/A):0Hr.	
Subject Code	BCE3P01	Community Engineering Project	
Examination Scheme			
Internal Marks:	University Marks:	Minimum Passing Marks:	Examination Duration:
----	100 Marks	50 Marks	Hours

Field Projects/Community Engagement Projects corresponding to the Major (Core) Subject

Project Objectives

1. Address real community needs through electrical engineering solutions
2. Develop practical implementation skills
3. Promote sustainable and cost-effective solutions
4. Foster community engagement and social responsibility
5. Apply theoretical knowledge to solve real-world problems

Project Guidelines Phase 1: Community Need Assessment

- Conduct community surveys and interviews
- Identify specific electrical/energy-related problems
- Document existing infrastructure and limitations
- Assess available resources and constraints
- Consider socio-economic factors

Phase 2: Project Planning

- Define clear project objectives and scope
- Create detailed technical specifications
- Develop budget and resource requirements
- Establish timeline and milestones
- Form community partnerships
- Consider safety regulations and standards

Phase 3: Implementation

- Create detailed design documentation
- Source materials and equipment

- Execute project in phases
- Involve community members in implementation
- Document progress and challenges
- Conduct regular safety checks

Phase 4: Evaluation and Sustainability

- Measure project impact
- Gather community feedback
- Train community members for maintenance
- Document lessons learned
- Create maintenance schedules
- Prepare handover documentation

Note: Proper format shall be developed for assessment based on above points

RASTRASANT TUKODOJI MAHARAJ NAGPUR UNIVERSITY

B. Tech. Semester-IV (Electronics and Telecommunication/Electronics and Communication/Electronics Engineering-Major)- NEP

SN	Course Category	Course Code	Name of Course	BoS	Teaching Scheme(hrs.)			Total Credit	Examination Scheme						
									Theory				Practical		
					(Th)	TU	P		Exam Hrs.	SEE	CIE	Min.	SEE	CIE	Min.
1	PCC-IV	BET4T11	Microcontroller and Application	ETRX	3	-	-	3	3	70	30	45	-	-	-
2	PCC-IV	BET4P11	Microcontroller and Application	ETRX	-	-	2	1	-	-	-	-	25	25	25
3	PCC-V	BET4T12	Analog and Digital communication	ETRX	3	-	-	3	3	70	30	45	-	-	-
4	PCC-V	BET4P12	Analog and Digital communication	ETRX	-	-	2	1	-	-	-	-	25	25	25
5	MDM-II	BMD4T02	Data Structure & Algorithms		2	-	-	2	3	70	30	45	-	-	-
6	OE-II	BOE4T02	Open Elective – II Refer OE Basket		2	-	-	2	3	70	30	45	-	-	-
7	AEC-II	BAE4T02	Technical Ability Enhancement	ETRX	2	-	-	2	3	70	30	45	-	-	-
8	HSSM-II	BHM4T02	Business management & Entrepreneurship	ASH	2	-	-	2	3	70	30	45	-	-	-
9	VEC-II	BVE4T02	Environment Science	ASH	2	-	-	2	3	70	30	45	-	-	-
10	VSC-II	BVS4P02	Software Workshop	ETRX	-	-	4	2	-	-	-	-	50	50	50
			Total		16	-	08	20		490	210		100	100	

Open Elective-II:

1. Biomedical Engineering (for other branches)

MDM-II:

1. Data Structure & Algorithms

Dr. N. G. Bawane.

Dr. S. L. Badjate.

Dr. P. Khandait

Dr. R. D Raut

RASHTRASANT TUKADOJI MAHARAJ NAGPUR UNIVERSITY, NAGPUR

B. TECH. ELECTRONICS / ELECTRONICS & TELECOMMUNICATION / ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week			
Total Credit:03	Lecture(L):3 Hrs		Tutorial/Activity(T/A):0Hr.	
Course Category: PCC-IV	Course Code	BET4T11	Microcontroller And Application	
Examination Scheme				
CIE (Internal Marks):	SEE (University Marks):		Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks		45 Marks	3 Hours

Course Objectives: -

1. To study and understand architecture of microcontrollers.
2. To study and understand the programming concept of 8051 microcontroller.
3. To understand the interrupt mechanism, PPI and I/O devices interfacing and its programming.
4. To study and impart different programming languages & tools for design of embedded systems.
5. To gain knowledge about advanced processors/controllers like ARM, PIC, MSP-430 and Arduino platform etc.

Course Outcomes: -

After completion of this course, students will demonstrate the ability to:

CO1. Identify and demonstrate the various blocks of 8051 microcontroller.

CO2. Demonstrate the programming model of 8051 microcontroller.

CO3. Design and implement 8051 microcontroller-based systems for various applications

CO4. Illustrate & program AVR / RISC microcontrollers in Integrated Development environment.

CO5. Design and implement advanced processor/controllers-based systems for various applications.

Course Contents:

UNIT I: Introduction to 8051 Architecture: (8Hours)

The 8051 Architecture- Hardware, Oscillator and clock-program counter, data pointer, registers, stack and stack pointer, special function registers, memory organization, program memory, data memory, Input / Output Ports, External memory counter and timer, serial data Input / output, Interrupts.

UNIT II: 8051 Programming in Assembly Language: (7Hours)

Basics of 8051 Assembly Language Programming, Structure of Assembly language, Assembling and running an 8051 program, Moving Data, Different Addressing modes, Accessing memory using various addressing modes, Arithmetic operations and Programs, Logical operations and Programs,

Branching, I/O Port Programs, bit level instructions and Programs, Timer and counters, and application Programs, Interrupt programming, 8051 programming in 'C'.

UNIT III: APPLICATIONS OF 8051 MICROCONTROLLER: (7 Hours)
Peripheral Interfacing-Memory Interfacing, 7-Segment LED Display, LCD and Keyboard Interfacing, ADC, DAC interfacing, relay, Stepper Motor Interfacing, DC motor control, different Sensors and relevant application programs.

UNIT IV: INTEGRATED DEVELOPMENT ENVIRONMENT (IDE) FOR MICROCONTROLLERS: (7 Hours)
Integrated Development Environment (IDE), Editor, Linker, Loader, Debugger, Simulator and Emulator. Instruction Set and Formats, Assembler Directives, Addressing Modes of AVR Microcontroller, Basic programming using AVR assembly instructions, cross compiler, ISP, simple program for delay generation.

UNIT V: INTRODUCTION TO OTHER ADVANCED MICROCONTROLLERS: (7 Hours)
Introduction to ARM and PIC Processors of MSP 430 Microcontroller, 16 bit Micro-controllers overview; features, Architecture, Addressing Modes, Low power feature of MSP 430. Introduction to Embedded C and Arduino platform, Concept of digital and analog ports in Arduino.

Text Books

1. The AVR Microcontroller and Embedded Systems: A System Approach by Muhammad A. Mazidi, 1st Ed., PHI, 2013.
2. Kenneth J. Ayala, "The 8051 Microcontroller", Penram International Publishing, 1996.
3. Embedded C Programming and the ATMEL AVR by R H Barnett 2nd Ed., Cengage Learning Publication, 2006.

Reference Books:

1. The 8051 Microcontroller: A System Approach by Muhammad Mazidi, 1st Ed., PHI, 2012.
2. D. M Calcutt, Fredrick J. Cowan " 8051 microcontrollers: an application based introduction".
3. Subrata Ghoshal "8051 microcontroller" Pearson Education.

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B. TECH. ELECTRONICS / ELECTRONICS & TELECOMMUNICATION / ELECTRONICS & COMMUNICATION ENGINEERING

SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week		
Total Credit:01	Practical:2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: PCC-IV	Course Code	BET4P11	Microcontroller And Application (Practical)

Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	---

Course Objectives: -

1. To study and understand architecture of microcontrollers.
2. To study and understand the programming concept of 8051 microcontrollers.
3. To understand the interrupt mechanism, PPI and I/O devices interfacing and its programming.
4. To study and impart different programming languages & tools for design of embedded systems.
5. To gain knowledge about advanced processors/controllers like ARM, PIC, MSP-430 and Arduino platform etc.

Course Outcomes: -

After completion of this course, students will demonstrate the ability to:

CO1. Identify and demonstrate the various blocks of 8051 microcontroller.
CO2. Demonstrate the programming model of 8051 microcontroller.
CO3. Design and implement 8051 microcontroller-based systems for various applications
CO4. Illustrate & program AVR / RISC microcontrollers in Integrated Development environment.
CO5. Design and implement advanced processor/controllers-based systems for various applications.

Suggested List of Practical:

1. Write sample assembly language program using various addressing modes and assembler directives.
2. Write an ALP to transfer data from source to destination location of internal/external data memory.
3. Write an ALP to generate delay using register.
4. LCD - MCU interfacing and displaying a string.
5. MCU interfacing take a input from keypad and display on LCD.
6. Stepper Motor Control Using ATMEGA-16 Microcontroller.
7. Interface a LED matrix and display a number on the matrix.
8. Interfacing 4x4 switch matrix with the microcontroller.
9. Implementation of Digital FIR Filter on 8051 Microcontroller.
10. Serial Communication between micro controller and PC.

11. Temperature control using ATmega16.
12. Develop an ALP to generate pulse and square wave by using Timer delay
13. Logic implementation for traffic Control Application.
14. Logic implementation for Bottle Filling Application.
15. Tune PID controller for heat exchanger using DCS.
16. To interface LED with Arduino and write a program to turn on LED for 1 seconds after every two seconds.
17. . Interface ADC with 8051 microcontroller and verify input/output.

Web links:

1. http://vlabs.iitkgp.ernet.in/rtes/index.html#
2. http://ial-coep.vlabs.ac.in/List%20of%20experiments.html

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week		
Total Credit:03	Lecture(L):3 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: PCC-V	Course Code	BET4T12	Analog and Digital Communication
Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Prerequisites:
1.Basic components and representation of Analog and Digital signals.
2.Basic understanding of Signals and Systems.
3.Understanding of Electronics devices and digital systems.

Course Objectives:
1.To understand the fundamentals of amplitude modulation schemes.
2.To understands the concept of Angle and Pulse modulation.
3.To analyze the performance of AM, FM receivers and effect of Noises.
4. To investigate the Digital Communication concepts and Modulation techniques.
5. To acquire the knowledge of Channel coding
6. To study Spread spectrum methods.

Course Outcomes:
After completion of this course, students will demonstrate the ability to:
1.Illustrate the concept of amplitude modulation techniques.
2.Analyze different angle & pulse modulation
3.Examine the different parameters of communication receivers & effect of noise
4.Describe the digital modulation concepts & Techniques.
5.Apply the concepts of source & channel coding and examine the Spread spectrum methods.

SYLLABUS

UNIT I: Amplitude Modulation: (7 Hours)
Review of signals and systems, need for modulation, Amplitude modulation, DSB-SC, SSB, VSB transmission, Modulation index, frequency spectrum and Power requirement, AM Transmitter.

UNIT II: Angle Modulation & Pulse Modulation [8 Hours]
Angle modulation: Frequency modulation, modulation index, frequency spectrum, Pre emphasis and de-emphasis techniques, FM Transmitter block diagram, Phase modulation and its spectral characteristics. Generation and demodulation of PAM, PWM, PPM.

UNIT III: Noise and Receivers [8 Hours]
Sources of noise, shot noise, thermal noise, noise calculations, equivalent noise bandwidth. Basic receiver (TRF), Super heterodyne receiver, performance parameters for receiver such as sensitivity, selectivity, fidelity, image frequency rejection etc., AM detectors, FM discriminators.

UNIT IV: Digital Modulation concepts [8 Hours]
Block diagram of Digital communication system, Sampling Process, Pulse code modulation, Delta modulation, Matched filter receiver, probability of error, BPSK, BFSK, QPSK, MSK, DPSK.

UNIT V: Source Coding & Channel Coding and Spread Spectrum Methods: [8 Hours]
Source coding theorem, Huffman coding Convolution coding, distance properties, Vierbi algorithm, Fano algorithm.
Study of PN sequences, Direct sequence method, Frequency hop method, Slow and Fast Frequency Hopping, applications of Spread spectrum, CDMA, OFDM

Textbooks:

1. Electronic Communication System by Gorge Kennedy,4th Edition,Tata McGraw-Hill.
2. Communication Systems by Simon Haykin ,2001,Tata McGraw-Hill
3. Digital communication by Simon Haykin,2009 Reprint,John Wiley& Sons.
4. Digital communication by John G Prokis,4th Edition 2000,Tata McGraw-Hill.

Reference books:

1. Digital Communication by J.S. Chitode,1st Edition, Technical Publications.
2. Modern Digital and Analog communications systems by B.P. Lathi,4th edition, Oxford University.
3. Digital Communication (Fundamentals & applications) by Bernard Skalr,2nd Edition Prentice Hall Communications
4. Digital & Analog Communication System by Sam Shanmugam,1st Edition , John Wiley& Sons
5. Communication Systems Engineering, John G Prokis & M. Salehi,2002,Pearson Education

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week		
Total Credit:01	Practical:2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: PCC-V	Course Code	BET4P12	Analog and Digital Communication (Practical)

Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
25 Marks	25 Marks	25 Marks	---

Course Objectives:

1. To demonstrate the performance of Analog Communication systems.
2. To demonstrate performance of digital Communication systems.
3. To analyze any modulation system using communication software.

Course Outcomes:

At the end of this course students will be able to

1. Evaluate the performance of analog communication techniques.
2. Evaluate the performance of digital communication techniques.
3. Simulation of analog & digital communication system using communication software.

List of Experiments: (Perform any 8 – 10 Experiments)

S.No	Name of Experiments
1.	To generate Amplitude Modulated wave using different techniques and plot its waveform.
2.	To generate Frequency Modulated wave using different techniques and plot its waveform.
3.	To generate Pulse Amplitude Modulation (PAM) and plot the waveforms. Observe the demodulated output.
4.	To generate Pulse Width modulated signal and study PWM demodulation.
5.	To generate Pulse Position modulated signal and study PPM Demodulation.
6.	To study Single side band (SSB) / SSB-SC / DSB-SC Transmission & Reception
7.	To study the performance of Delta modulator/De-modulator circuits.
8.	To study the performance of adaptive Delta modulator/De-modulator circuits.
9.	To study generation & reception of BPSK & perform its spectral analysis.
10.	To study generation & reception of FSK & perform its spectral analysis.
11.	To study generation & reception of QPSK & perform its spectral analysis.

12.	To study generation & reception of MSK & perform its spectral analysis.
13.	To study generation & reception of DPSK & perform its spectral analysis.
14.	To study generation of PN sequence & study of spread spectrum method.
15.	To perform convolution encoding & decoding.
16.	To explore any communication software.

Beyond/Additional Syllabus Experiments:
Mini Project Based on Analog & Digital communication System

Reference Books:

1. Digital Communication (Fundamentals & applications By Bernard Sklar, 2nd Edition, Prentice Hall Communications.

2. Digital Communication By John G. Proakis, 4th Edition 2000, Tata McGraw-Hill.

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week		
Total Credit:02	Lecture(L):2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: MDM-II	Course Code	BMD4T02	Data Structure and Algorithms
Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives:

1. To make students understand efficient storage structures of data for easy access.
2. To teach the difference between linear & nonlinear data structures and its respective benefits
3. design and implement various data structures.
4. To develop applications using data structures and algorithms and analysis.
5. To improve problem-solving efficiency.

Course Outcomes:
At the end of this course students will be able to

1. Students will be able to choose appropriate data structure based on the specified problem definition and analysis of the algorithm.
2. Students will be able to handle operations like searching, insertion, deletion, traversing mechanism etc. on various data structures.
3. Students will be able to apply concepts learned in various domains like Operating Systems, DBMS etc.
4. Students will be able to use linear and non-linear data structures like stacks, queues, linked list, trees etc.

SYLLABUS

UNIT I: Data Structures **(6H)**

Introduction to Data Structures, Need of Data Structure, Abstract Data type, Types of Data Structures Algorithms: Searching- Linear & Binary Search, Sorting- Bubble Sort, Insertion Sort, Selection Sort, Algorithm design strategies - Divide and Conquer strategy, Merge Sort, Quick Sort, and complexity analysis of sorting methods.

UNIT II: Abstract Data Types (ADTs) Arrays **(6H)**

Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays Stacks- Introduction, PUSH and POP operations on Stacks, Prefix, Infix & Postfix expressions- Conversion and Evaluation, Multiple Stacks. Queues- Introduction, Insertion & deletion in Queues, Circular Queues, Priority Queues.

UNIT III: Linked List- Linked List as ADT (7H)

Dynamic Memory Allocation Functions, Types of Linked Lists- (single, double, circular), Operations on Linked Lists- (create, insert, delete, reverse etc.), Applications of Linked List- Polynomial Representation (Addition/deletion/multiplication of two polynomials). Trees- Introduction, Implementation of Trees, Tree Traversals with an Application, Binary Trees, BST- Insertion & Deletion, Expression Trees, AVL Trees, Heap Trees.

UNIT IV: Graphs (7H)

Graphs- Data Structures for Graphs, Graph Traversals Directed Graphs, Graph Storage Structures (Adjacency Matrix, Adjacency List) Weighted Graphs, Shortest Paths, and Minimum spanning Trees. Applications for DFS and BFS. Shortest-Path Algorithms, Dijkstra's Algorithm, Hamiltonian Path.

HASING TECHNIQUES

Symbol Tables: static tree tables, dynamic tree tables, hash tables, hash functions, Collision resolution, overflow handling, Applications

Textbooks:

1. Data Structures with C, Seymour Lipschutz, Schaums Outlines, Tata McGraw Hill Education.
2. Fundamentals of Computer Algorithms by Horowitz, Sahni, Galgotia Pub. 2001 ed.
3. Data Structures using C and C++ by Y. Langsam, Pearson Education.
4. Data Structures using C by Tanenbaum, Pearson Education
5. Data structures and Algorithm Analysis in C, 2nd edition, M.A. Weiss, Pearson

Reference books:

1. Data Structures and program design in C by Robert Kruse, Bruce Leung & Clovis Tondo.
2. Data Structures: A Pseudocode Approach with C by Richard F. Gilberg and Behrou Forouzan.
3. Fundamentals of Data Structures, Illustrated Edition by Ellis Horowitz, Sartaj Sahni, Computer Science Press.
4. Introduction to Algorithms, by Thomas Corman III edition, PHI
5. Analysis and Design of Algorithms: A Beginner's Approach, by Rajesh K. Shukla, Willey Publications
6. "Algorithms, Data Structures and Problem Solving with C++", Illustrated Edition by Mark Allen Weiss, Addison-Wesley Publishing Company.

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week		
Total Credit:02	Lecture(L):2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: OE-II	Course Code	BOE4T02	Biomedical Engineering
Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Prerequisites: Basic awareness of Engineering domain

Course Objectives:

1.To understand the biomedical signal acquisition and analysis.

2.To understand x-ray, MRI, CT, VR technologies and infra-red imaging.

3.To have thorough understanding of medical instruments & devices.

4.To understand medical informatics & new training & simulation technologies.

Course Outcomes:

1.Analyze the biomedical signals.

2.Describe x-ray, MRI, CT, VR technologies and infra-red imaging.

3.Describe different medical instruments & their applications.

4.Describe hospital information system & relevant training & simulation technologies.

Syllabus

Unit-1: Introduction to Biomedical Engineering: [6Hours]
Introduction to biomedical engineering, scope of electronics in biomedical engineering, block diagram of bio medical Electronics, Digital Biomedical Signal Acquisition and processing, advantages and disadvantages of Electronics in biomedical fields.

Unit2: Imaging: [6 Hours]
X-Ray, Computed Tomography, Magnetic Resonance Imaging, Ultrasound, Magnetic Resonance Microscopy, Positron-Emission Tomography (PET), Electrical Impedance Tomography, Medical Applications of Virtual Reality Technology.

Unit-3: Medical Instruments and Devices: [6Hours]
Bio potential Amplifiers, Bioelectric Impedance Measurements, Implantable Cardiac Pacemakers, Noninvasive Arterial Blood Pressure and Mechanics, Cardiac Output Measurement, Implantable Stimulators for Neuromuscular Control, Mechanical Ventilation, Essentials of Anesthesia, Biomedical Lasers Instrumentation for Cell Mechanics, Blood Glucose Monitoring, Noninvasive Optical Monitoring, Medical Instruments and Devices Used in the Home.

Unit-4: Medical Informatics: [6Hours]
Hospital Information Systems: Their Function and State, Computer-Based Patient Records, Overview of Standards Related to the Emerging Health Care Information Infrastructure, Risk Factors, Safety, and Management of Medical Equipment, Medical Informatics and Biomedical Emergencies: New Training and Simulation Technologies for First Responders, Regulatory and

Assessment Agencies, Ethical Issues Associated with the Use of Medical Technology.

Textbooks:

1. Medical Devices and Systems By Joseph D. Bronzino, Trinity College. Hartford, Connecticut, S.A, 3rd Edition

2. Biomedical Engineering- from theory to applications, By Reza Fazel-Rezai, University of North Dakota, 2011 Edition

3. Handbook of Biomedical Instrumentation By R.S. Khandpur, 2nd Edition 2003, Tata McGraw-Hill

4.Biomedical Instrumentation Technology and Applications By Libro R. Khandpur, 2004 Edition Tata McGraw-Hill

Reference books:

1.Biomedical digital signal processing By Willis J. Tompkins,1995 Edition, Prentice Hall India,

2.Biomedical Signal Processing and Signal Modeling By E. N. Bruce, 2009 Edition, Wiley

3.Bio signal and Medical Image Processing By John L. Semmlow and Benjamin Griffel, 3rd Edition ,CRC Press, 2014.

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution Per Week		
Total Credit:02	Lecture(L):2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: AEC-II	Course Code	BAE4T02	Technical Ability Enhancement
Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objective:
To introduce basic computer skills to students at UG level in non-technical subjects.
After completion of this course, the students are expected.

Course outcomes: By the end of the course, students will be able to
1.To acquire some basic knowledge about computers
2 To develop some basic skills in using computers for data storage, compilation, analysis and presentation.

UNIT–I (6 Hours)

Introduction: An introduction to writing technical reports, technical sentences formation, using transitions to join sentences, Using tenses for technical writing.

Planning and Structuring: Planning the report, identifying reader(s), Voice, Formatting and structuring the report, Sections of a technical report, Minutes of meeting writing.

UNIT–II (6 Hours)

Drafting report and design issues: The use of drafts, Illustrations and graphics, Basic Word Processing Introduction to Word Processing: Opening Word Processing Package, Opening and closing documents, using a Document/Help Wizard, Text Creation and Manipulation, Formatting the Text, Handling Multiple Documents, Table Manipulation, Printing, saving documents in different formats.

Unit III: (6 Hours)

Power Point Presentations Skills: Basics and Difference between presentation and document, Using Power Point, Creation of Presentation, Preparation of Slides, Selection of type of Slides, importing text from word documents, Providing aesthetics- Slide Designs, Slide Manipulation and Slide Show, Presentation of the Slides

Unit IV: (6 Hours)

Spreadsheets and Basic Data Analysis Spread Sheet, Elements of Electronics Spread Sheet, Application/usage of Electronic Spread Sheet, Manipulation of cells, Formulas and functions; Spread sheets for Small accountings maintaining invoices/budgets, basic practical data analysis works (Maintaining daily and monthly sales reports).

Note: Activity based Learning: Activities based on course contents should be conducted like Mini Project/ Case studies / classroom activities.

Reference Material:

1. C.S. French "Data Processing and Information Technology", BPB Publications 1998
2. P.K Sinha, Computer Fundamentals, BPB Publications, 1992
3. Guy Hart-Davis "The ABCs of Microsoft Office 97 Professional edition", BPB Publications, 1998
4. Karl Schwartz, "Microsoft Windows 98 Training Guide", 1998
5.T. Ramappa, Intellectual Property Rights Under WTO, S. Chand Publishers, 2008
6. R. P. Merges, P. S. Menell, Mark A. Lemley, Intellectual Property in New Technological Age 1997

Links for reference:

1. https://www.udemy.com/course/reportwriting/
2.https://www.udemy.com/course/professional-business-english-and-technical-report-writing/
3. https://www.udemy.com/course/betterbusinesswriting/

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution Per Week		
Total Credit:02	Lecture(L):2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: HSSM-II	Course Code	BHM4T02	Business Management & Entrepreneurship

Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objective:

The objective of the course is to impart theoretical and practical know-how to the learners on various intrinsic and essential fundamental as well as advanced knowledge pertaining to Business management and Entrepreneurship.

Course outcomes:

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

1. Acquire knowledge of management functions and structures.
2. Understand the concept of marketing and financial management
3. Realize the importance of project reports and concept of ideation
4. Analyze the need of SSI and Industrial sickness

UNIT–I

Definition, nature and scope of management Principles of management, function of management, structure of organization, delegation of Authority and sources of power.

UNIT–II

Meaning of Marketing management, concepts of Marketing. Marketing Mix, Channels of distribution, Advertising and sales promotion. Meaning of financial management, Brief outline of profit and loss account, balance sheet, Budgets and their importance,

Unit III

Concept of entrepreneurship, characteristics of an Entrepreneur, types of Entrepreneurship, Functions of Entrepreneurs, factors affecting the growth of entrepreneurship, Women entrepreneurship in India, Problems and challenges of women entrepreneurs, Government's support system to develop women entrepreneurship.

UNIT IV

Nature, Scope and importance of SSI, Advantages and Limitations of SSI, Sickness in small scale industries, Major problems faced by SSIs, incentives to SSI, tax holidays.

List of reference books:

1. Entrepreneurship Development by Monica Loss F.L. Bascunan, Global Academic Publishers & Distributors, 2015.
2. Entrepreneurial Development By, S. S. Khanka S. Chand & Co. Ltd. New Delhi, 1999.
3. Entrepreneurial Development. By, S.Anil Kumar. New Age International.
4. Industrial Management I.K. Chopde, A.M. Sheikh.
5. Business Organization and Management S.A. Sherlekar

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution Per Week		
Total Credit:02	Lecture(L):2 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: VEC-II	Course Code	BVE4T02	Environment Science

Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
30 Marks	70 Marks	45 Marks	3 Hours

Course Objectives:

1. To understand the fundamentals of environmental science and its relevance in civil engineering.
2. To introduce concepts of sustainable development.
3. To study water resource management.
4. To create awareness of environmental laws and policies.

Course Outcomes:

1. Understand the fundamentals of environmental science.
2. Apply sustainable development principles in civil engineering.
3. Demonstrate knowledge of water resource management.
4. Interpret environmental laws and policies.

Unit I: Introduction to Environmental Science (6 Hours)

Definition, Scope, and Importance, Components of Environment: Atmosphere, Hydrosphere, Lithosphere, and Biosphere, Role of Civil Engineers in Environmental Protection, Man-Environment Relationship and Need for Sustainability

Unit II: Sustainable Development (6 Hours)

Concept of Sustainable Development in Civil Engineering, Green Building Concepts, LEED Certification, Solid and Hazardous Waste Management: Collection, Treatment, and Disposal, Environmental Impact Assessment (EIA): Methods and Case Studies, Life Cycle Assessment (LCA) in Civil Engineering.

Unit III: Water Resource Management (6 Hours)

Sources of Water: Surface and Groundwater, Rainwater Harvesting and Watershed Management Wastewater Treatment Technologies: Primary, Secondary & Tertiary Treatment.

Unit IV: Environmental Policies, Laws & Regulations (6 Hours)

Environmental Protection Act, 1986, Water (Prevention and Control of Pollution) Act, 1974 Air (Prevention and Control of Pollution) Act, 1981, Role of Pollution Control Boards, International Agreements: Kyoto Protocol, Paris Agreement.

Text/Reference Books:

1. "Environmental Science and Engineering" – Suresh K. Dhameja
2. "Environmental Engineering" – Peavy, Rowe, and Techobanoglous
3. "Environmental Studies" – R. Rajagopalan
4. "Waste Management and Environmental Sustainability" – S. Ramachandra Rao
5. "Introduction to Environmental Engineering" – Mackenzie L. Davis and David A. Cornwell

Online Learning Platform:

1. NPTEL (National Programme on Technology Enhanced Learning)

Website: https://nptel.ac.in

2. SWAYAM (Study Webs of Active Learning for Young Aspiring Minds)

Website: https://swayam.gov.in

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SYLLABUS

B.TECH. FOURTH SEMESTER (NEP)

Semester: IV	Total Hours Distribution per week		
Total Credit:02	Practical:4 Hrs		Tutorial/Activity(T/A):0Hr.
Course Category: VSC-II	Course Code	BVS4P02	Software Workshop (Practical)

Examination Scheme			
CIE (Internal Marks):	SEE (University Marks):	Minimum Passing Marks:	Examination Duration:
50 Marks	50 Marks	50 Marks	---

Prerequisites:

1. Basic knowledge of fundamental programming concepts such as variables, data types, loops, conditional statements, functions, and arrays.
2. Basic understanding of at least C/C++ programming language.
3. Understanding of basic electronic components such as resistors, capacitors, inductors, diodes, and transistors.
4. Knowledge of Ohm's law, Kirchhoff's laws, and basic circuit analysis techniques.

Course Objectives:

1. To instill in students, the ability to formulate and solve engineering problems in electric and electronic circuits involving both steady state and transient conditions using MATLAB and pSpice.
2. Learn to use the pSpice simulation software tool for the analysis of Electrical and Electronic Circuits
3. Learn to insert simple instructions to MATLAB, to find the solution of a system of linear algebraic equations, with constant (real and complex) coefficients.

Course Outcomes:

After the completion of the Practical's, the students will be able to:

1. Write MATLAB program for any given problem
2. Plot various functions using different graphical techniques.
3. Make mathematical analysis for the given problem
4. Get the complete expert hand on pSpice Software.
5. To draw, analyze and plot the electronic circuits using pSpice Software.

Exp. No.	Name of Experiment
	MATLAB
1	Introduction to MATLAB: To define & use variables, vectors, Matrices & its functions in MATLAB. To study various arithmetic operators and mathematical functions in MATLAB. To create & use m-files.

2	Basic plotting of signals: To study various MATLAB commands forcreating two and three dimensional plots. Write a MATLAB program to plot the following continuous time and discrete time Signals. i. Step Function ii. Impulse Function iii. Exponential Function iv. Ramp Function v. Sine Function
3	Write a MATLAB program to obtain linear convolution of the given sequences.
4	Write a MATLAB program to perform amplitude-scaling, time-scaling and time-shifting on a given signal.
5	Write a MATLAB program to obtain Cross correlation of sequencex(n) and y(n) & autocorrelation of a sequence x (n) of the given sequences & verify the property.
	PSPICE
6	Verification of Half–Wave and Full-Wave Rectifier.
7	Verification of Low pass and High pass Filter.
8	Frequency Response of CE Amplifier.
9	Design of Wein-Bridge Oscillator.
10	Verification of Clippers & Clampers Circuits.

Reference books:

1. MATLAB Programming for Engineers, 6th edition Stephen J. Chapman, BAE Systems

2. Introduction To PSpice Using OrCAD For Circuits And Electronics e,Publisher: Pearson Education