BAPATLA ENGINEERING COLLEGE:: BAPATLA

(Autonomous)

BAPATLA

B.Tech

OPEN ELECTIVE SYLLABUS

(R20 Regulations)

Bapatla Engineering College:: Bapatla

(Autonomous under Acharya Nagarjuna University)

(Sponsored by Bapatla Education Society)

BAPATLA-522102, Guntur District, A.P.

www.becbapatla.ac.in

Vision & Mission of the College

Vision:

To build centers of excellence, impart high quality education and instill high standards of ethics and professionalism through strategic efforts of our dedicated staff, which allows the college to effectively adapt to the ever changing aspects of education.

To empower the faculty and students with the knowledge, skills and innovative thinking to facilitate discovery in numerous existing and yet to be discovered fields of engineering, technology and interdisciplinary endeavors.

Mission:

Our mission is to impart the quality education at par with global standards to the students from all over India and in particular those from the local and rural areas. We continuously try to maintain high standards so as to make them technologically competent and ethically strong individuals who shall be able to improve the quality of life and economy of our country.

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LIST OF OPEN ELECTIVES :

Department	CODE	SUBJECT
AIML	CM1	Artificial Intelligence
	CM2	Introduction to Machine Learning
CIVIL	CE1	Air Pollution and Control
	CE2	Remote Sensing and GIS
CB	CB1	Digital Forensics
	CB2	Introduction to Information Security and Cyber Laws
CSE	CS1	Database Management System
	CS2	Java Programming
DS	DS1	Data Warehousing and Data Mining
	DS2	Social Network Analysis
ECE	EC1	Digital Image Processing
	EC2	Embedded System & Design
EEE	EE1	Non Conventional Energy Sources
	EE2	Electrical Energy Conservation and Auditing
	EE3	Industrial Electrical Systems
EIE	EI1	Sensors and Signal Conditioning
IT	IT1	Cyber Security
	IT2	Web Technologies
MECH	ME1	Automobile Engineering
	ME2	Renewable energy sources
	ME3	Project Management
	ME4	Entrepreneurship Development
CHEMISTRY	CY1	Chemistry in Space technology
	CY2	Artificial Intelligence in Sustainable Chemistry
	CY3	Material Chemistry in daily life
ENGLISH	EL1	Professional Communication
MATHS	MA1	Graph Theory
	MA2	Abstract Linear Algebra
PHYSICS	PH1	Nanomaterials and Technology
	PH2	Optoelectronic devices and applications
	PH3	Fiber optics communication
NCC	NCC	National Cadet Corps

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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ARTIFICIAL INTELLIGENCE
IV B.Tech – VII Semester (Code: OCM1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:
Students will be able to

- Understand the fundamental concepts of artificial intelligence, and their environment, various Search techniques
- Understand knowledge representation using predicate logic and rules
- Understand the planning techniques.
- Understand how to design and solve Learning techniques and Expert systems.

Course outcomes:
Students will be able to
CO1: Understand the fundamental concepts of artificial intelligence, search techniques for solving simple AI problems and their environments.
CO2: Apply knowledge representation using predicate logic and rules.
CO3: Utilize the planning techniques.
CO4: Possess the knowledge of the concepts of Learning and Expert Systems.

UNIT- I

Introduction to AI: What is AI? , Foundations of AI, History of AI, State of the Art. **Intelligent Agents**: Agents and Environments, Good Behavior: Concept of Rationality, The Nature of Environments And The Structure of Agents. **Solving Problems by Searching:** Problem Solving Agents, Searching for Solutions, **Uninformed Search Strategies:** Breadth First Search, Uniform Cost Search, Depth First Search, Iterative Deepening DFS and Bi-directional Search. **Informed (Heuristics) Search Strategies:** Greedy BFS, A* Algorithm, AND-OR Search trees, **Constraint Satisfaction Problems:** Defining Constraint Satisfaction Problems, Local Search in CSP

UNIT – II

Logical Agents: Knowledge Based Agents, The Wumpus World, Logic and Propositional Logic**, Propositional Theorem Proving:** Inference and proofs, Proof by resolution, Horn clauses and definite clauses, Forward and Backward chaining. **First Order Logic:** Representation, Revisited Syntax and Semantics of First Order Logic, Using First Order Logic, Knowledge Engineering in First Order Logic. **Inferences in First Order Logic:** Propositional vs. First Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution.

UNIT – III

Knowledge Representation: Ontological Engineering, Categories and Objects, Events, Mental Events and Mental Objects, Reasoning Systems for Categories, Reasoning with Default Information.

Slot and Filler Structures: Semantic Nets, Conceptual Dependency, Scripts. **Planning:** Overview - An Example Domain, The Blocks World, Component of Planning Systems, Goal Stack Planning, Hierarchical planning, Reactive systems.

UNIT - IV

Learning: Introduction to learning, Rote learning, Learning by taking advice, Learning in problem solving, Learning from examples, Induction Learning, Explanation Based Learning. **Expert Systems:** Representing and using domain knowledge, Expert system shells, Explanation, Knowledge Acquisition.

TEXT BOOKS:

1. Stuart Russel and Peter Norvig, Artificial Intelligence – A Modern Approach, 3rd Edition, Pearson Education/ PHI..
2. Elaine Rich & Kevin Knight, Artificial Intelligence, 3rd Edition, (TMH).

REFERENCE BOOKS:

1. 'Patrick Henry Winston. Artificial Intelligence. Pearson Education, 3 edition, 2007. ISBN 81317 15051
2. Saroj Kaushik. Artificial Intelligence. CENGAGE Learning, 1 edition, 2020. ISBN 9788131510995.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	-	-	2	-	1	-	1	2	1	-	-	-	1	1	1
CO2	-	-	2	-	2	-	2	3	-	2	1	-	1	2	2
CO3	-	2	-	-	-	2	-	-	1	-	2	-	2	1	1
CO4	-	1	-	1	-	-	1	-	1	-	-	1	2	2	1

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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INTRODUCTION TO MACHINE LEARNING
IV B.Tech – VII Semester (Code: OCM2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

- Learn machine learning libraries and implement linear regression
- Comprehend decision tree learning and neural networks
- Use libraries of generative classifiers and discriminative classifiers and build a model
- Understand computational learning theory and instance based learning.

Course outcomes:

Students will be able to

CO1: Use python-based machine learning libraries. Learn implementation of linear regression models.

CO2: Comprehend decision tree learning algorithm. Apply neural networks and learn from real world data

CO3: Understand generative classifiers. Analyze discriminative classifiers

CO4: Understand computational learning theory. Comprehend instance based learning.

Analyze unsupervised learning algorithms.

UNIT- I

Introduction: Introduction to machine learning, Essential Python Libraries: Scikit-learn, Jupyter Notebook, NumPy, matplotlib, Pandas. A First Application: Classifying iris species using Sci-kit learn.

Linear Regression: Simple linear regression. Batch gradient decent algorithm, Stochastic gradient descent algorithm, Multiple linear regression**,** Locally weighted linear regression.

UNIT – II

Decision Tree Learning: Decision Tree representation, Decision Tree learning, hypothesis space search in Decision Tree learning, inductive bias in Decision Tree learning and issues in Decision Tree learning.

Artificial Neural Networks: Neural Network representations, Perceptron, Perceptron Training rule, Gradient Descent and the delta rule, Multilayer Networks and the Back propagation algorithm and remarks on the Back propagation algorithm.

UNIT – III

Generative Classifiers: Learning classifiers based on Bayes Rule, Naïve Bayes Algorithm, Conditional Independence, Derivation of Naïve Bayes Algorithm, Naïve Bayes for discrete-valued Inputs, Naïve Bayes for continuous inputs.

Discriminative Classifiers:: Logistic Regression, Estimating Parameters for Logistic Regression, Regularization in Logistic Regression

UNIT - IV

Computational learning theory: Introduction, probably learning an approximately correct hypothesis, sample complexity for finite hypothesis spaces.

Instance Based Learning: Introduction, k-Nearest Neighbor learning.

Unsupervised Learning: K-means clustering algorithm, Gaussian mixture model, EM algorithm.

TEXT BOOKS:

1. Introduction to Machine Learning with Python by Andreas C. Mueller and Sarah Guido by O'Reilly Media.(Unit-1)
2. Lecture Notes by Mr. Andrew Ng, Stanford University https://see.stanford.edu/materials/aimlcs229/cs229-notes1.pdf(Unit-2)
3. Tom M. Mitchell, "Machine Learning", First Edition, Mc. Graw Hill Publishing. (including draft chapters of second edition)

REFERENCE BOOKS:

1. 'Lecture Notes by Mr. Andrew Ng, Stanford University https://see.stanford.edu/materials/aimlcs229/cs229-notes1.pdf

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1	2	3	-	3	-	-	-	-	-	-	1	3	3	3
CO2	1	2	3	-	3	-	-	-	-	-	-	1	3	3	3
CO3	1	2	3	-	3	-	-	-	-	-	-	1	3	3	3
CO4	1	2	3	-	3	-	-	-	-	-	-	1	3	3	3

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AIR POLLUTION AND CONTROL

IV B.Tech – VII Semester (Code: OCE1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

- To make the students aware of sources and effects of air pollution.
- To make the students aware of the dispersion phenomenon of air pollutants covering meteorological parameters, stability of atmosphere and corresponding plume shapes.
- Able to understand the air pollution particulate control by equipment's.
- Able to understand the control methods for NOx and Sox by various methods and also study about air quality management..

Course outcomes:

CO1:Understood the concepts regarding the sources and effects of Air Pollution on human beings, plants, animals and materials.

CO2: Knowledge gained on meteorological parameters influencing the Air Pollution and analyzes pollutant dispersion model studies.

CO3: Able to Design various air pollution particulate control equipment's in Industries.

CO4: Know the methods to control the various gaseous pollutants.

UNIT-I

Air Pollution- Definitions, Air Pollutants-Classifications- Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution- stationary and mobile sources.

Effects of Air pollutants on man, material and vegetation; Global effects of air pollution- Green House effect, Acid Rains, Ozone Depletion etc.

UNIT-II

Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity, Influence of Meteorological phenomenon Air Quality- wind rose diagrams.

UNIT-III

Lapse Rates, Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

Control of particulates- Control at Sources, Process Charges, Equipment modifications, Design and operation of control. Equipment's- Settling chambers, Centrifugal separators, filters, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT-IV

General Methods of Control of NOx and SOx emissions- In plant Control Measures, process

changes, dry and wet methods of removal and recycling.
Air Quality Management- Monitoring of SPM, SO; NO AND CO Emission Standards.

TEXT BOOKS:

1. Air pollution by M.N.Rao and H.V.N.Rao – Tata Mc.GrawHill Company
2. Air pollution by Warkand Warner – Harper& Row, NewYork.

REFERENCE BOOKS:

1. An introduction to Air pollution by R.K.Trivedy and P.K.Goel, B.S.Publications
2. Air Pollution and control by KVSG Murali Krishna, Laxmi Publications

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes																
	PO's												PSO's			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**
CO1	2	3		1		3	3	1					3	3	1	2
CO2	3	2	3	1	2	1	2						2	2	1	1
CO3	3	3	3	2	2	1	3		2			1	2	3	2	2
CO4	2	3	3	3	2	1	3	1	2			1	2	3	2	1

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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REMOTE SENSING & GEOGRAPHICAL INFORMATION SYSTEMS
IV B.Tech – VII Semester (Code: OCE2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

- Learn basic concepts of Aerial Photographs.
- Learn basic concepts of remote sensing and its characteristics, satellite sensors and platforms.
- Know about satellite digital image processing and classification techniques.
- Understand the basic concepts GIS, spatial data and analysis.
- applications of GPS in surveying.
- Know various remote sensing and GIS applications in civil engineering.

Course outcomes:

CO1: Analyse the principles and components of photogrammetry & Interpret Information from Aerial Photographs.

CO2: Exposure on Basics of Remote Sensing, Satellite Sensors and Platforms, Practical Knowledge on Satellite Image Classification.

CO3: Know Basics of GIS And Map Making. Exposure About Spatial Analysis Using Overlay Tools.

CO4: Exemplying GeoTag Assets Using GPS And Add Attribute & MetaData, Get the Knowledge on Various Remote Sensing and GIS Applications in Civil Engineering.

UNIT- I

PHOTOGRAMMETRY:

Fundamentals of Photogrammetry and Photo interpretation – types of photographs; Vertical photographs – principal point; scale; Stereoscopy; Overlap, side lap and flight planning.

UNIT – II

REMOTE SENSING:

Introduction to Remote Sensing: Basic concepts of remote sensing, electromagnetic radiation, electromagnetic spectrum, interaction with atmosphere and target –

Sensors and platforms: Introduction, types of sensors, airborne remote sensing, Space-borne remote sensing. Visual Interpretation Techniques.

Overview of Indian Remote sensing satellites and sensors, satellite definition and types, characteristics of satellite, characteristics of satellite orbit

UNIT – III

GEOGRAPHIC INFORMATION SYSTEM (GIS)

Introduction, key components, data entry &preparation – Spatial data input, Raster Data Model, Vector Data Model, Raster Vs Vector, advantages and dis advantages of Raster & Vector. Network analysis - concept and types, Data storage-vector data storage, attribute data storage.

UNIT - IV

GLOBAL POSITIONING SYSTEM (GPS) & RS AND GIS APPLICATIONS:

GPS definition, components of GPS, GPS receivers. Space, Control and User segments of GPS. Advantages and disadvantages of GPS, Limitations and applications of GPS Indian Systems (IRNSS, GAGAN)Development of GPS surveying techniques, Navigation with GPS, Applications of GPS.

Applications: Photogrammetry, Remote Sensing and Geographical information Systems

TEXT BOOKS:

1. Bhatta B (2008), 'Remote sensing and GIS', Oxford University Press
2. Chang, K. T. (2006). Introduction to Geographic Information Systems. The McGraw-Hill.
3. Lillesand, T.M, R.W. Kiefer and J.W. Chipman (2013) 'Remote Sensing and Image Interpretation', Wiley India Pvt. Ltd., New Delhi
4. Schowenger, R. A (2006) 'Remote Sensing' Elsevier publishers.
5. Parkinson,B. W., Spilker, J. J. (Jr.) (1996). Global Positioning System: Theory & Applications (Volume-I). AIAA, USA

REFERENCE BOOKS:

1. 'Fundamentals of Remote Sensing' by George Joseph, Universities Press, 2013
2. 'Fundamentals of Geographic Information Systems' by Demers, M.N, Wiley India Pvt.Ltd, 2013.
3. Jensen John R. Introduction to Digital Image Processing: A Remote Sensing Perspective Prentice hall, New Jersey
4. Paul Wolf, Elements of Photogrammetry, McGraw Hill.
5. Leick Alfred, 1995: GPS Satellite Surveying, Wiley Interscience
6. Burrough, P. P. &McDonnel, R. A. (1998). Principles of GIS. Oxford University Press.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes																
	PO's												PSO's			
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**	**4**
CO1	3			3												
CO2	3	1	3	3	3								2		1	
CO3	3		3	3	3				2						1	2
CO4	3	1	3	3	3				2				2		2	2

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DIGITAL FORENSICS
IV B.Tech – VII Semester (Code: OCB1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:
Students will be able to

- Identify different techniques of data acquisition in Digital Forensics, Prepare for investigation process
- Analyze Crime & Incident Scenes using Windows Forensics, Process Log & Event analysis
- Investigate Network, Wireless & Web attacks.
- Process E-mail, Mobile Device attack incidents.

Course outcomes:
Students will be able to
CO1: Identify different techniques of data acquisition in Digital Forensics, Prepare for investigation process
CO2: Analyze Crime & Incident Scenes using Windows Forensics, Process Log & Event analysis
CO3: Investigate Network, Wireless & Web attacks.
CO4: Process E-mail, Mobile Device attack incidents

UNIT- I

Introduction: Introduction and Overview of Cyber Crime, Nature and Scope of Cyber Crime.

Types of Cyber Crime: Social Engineering, Categories of Cyber Crime. Property Cyber Crime.

UNIT – II

Cyber Crime Issues: Unauthorized Access to Computers, Computer Intrusions. White collar Crimes. Viruses and Malicious Code, Internet Hacking and Cracking. Virus Attacks.
Privacy: Software Piracy, Intellectual Property Mail Bombs, Exploitation, Stalking and Obscenity Internet, Digital laws and legislation. Law Enforcement Roles and Responses.

UNIT – III

Investigation: Introduction to Cyber Crime Investigation, Investigation Tools, eDiscovery, Digital Evidence Collection, Evidence Preservation, E-Mail Investigation, E-Mail Tracking, IP Tracking, E-Mail Recovery.

Case Studies: Hands on Case Studies, Encryption and Decryption Methods, Search and Seizure of Computers, Recovering Deleted Evidences, Password Cracking.

UNIT - IV

Digital Forensics: Introduction to Digital Forensics, Forensic Software and Hardware, Analysis and Advanced Tools. Forensic Technology and Practices,

Forensic Ballistics and Photography, Face ,Iris and Fingerprint Recognition, Audio Video Analysis. Windows System Forensics, Network Forensics.

Laws and Acts: Laws and Ethics, Digital Evidence Controls, Evidence Handling Procedures, Basics of Indian Evidence ACT IPC and CrPC, Bectronic Communication Privacy ACT, Legal Policies.

TEXT BOOKS:

1. Nelson Phill ps and Enfinger Steuart, "Computer Forensics and Investigations", Cengage Learning, New Delhi, 2009.
2. Kevin Mandia. Chris Prosise. Matt Pepe. "Incident Response and Computer Forensics •. Tata McGraw -Hill,New Delhi,2006.

REFERENCE BOOKS:

1. 'The basics of digital Forensics (Latest Edition) – The primer for getting started in digital forensics by John Sammons – Elsevier Syngress Imprint
2. Cybersecurity – Understanding of cybercrimes, computer forensics and Legal perspectives by Nina Godbole and Sunit Belapure – Wiley India Publication.

E-LEARNING RESOURCES:

1. https://nptel.ac.in/
2. https://www.coursera.org/
3. Ministry of Electronics and Information Technology (MeitY) – Govt of India – Information Security Project – https://www.infosecawareness.in/

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1	2	1	2	3	3	-	1	-	-	-	-	2	1	-
CO2	1	2	1	2	3	3	-	1	-	-	-	-	2	1	-
CO3	1	2	1	2	3	3	-	1	-	-	-	-	2	1	-
CO4	1	2	1	2	3	3	-	1	-	-	-	-	2	1	-

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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INTRODUCTION TO INFORMATION SECURITY AND CYBER LAWS
IV B.Tech – VII Semester (Code: OCB2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:
Students will be able to

- Comprehend Information systems and importance of security
- Gain knowledge of application security and counter measures for the threats
- Understand the architecture and design of security governance and risk management
- Learn security policies and cyber laws

Course outcomes:
Students will be able to
CO1: Know the importance of Information systems and importance of security
CO2: Gain knowledge of application security and counter measures for the threats
CO3: Understand the architecture and design of security governance and risk management
CO4: Learn security policies and cyber laws

UNIT- I

Introduction to Information Systems and Security: Information Systems, Types of IS, Development of IS, Introduction to Information Security, Need for Information Security, Threats to Information Systems, Information Assurance, Cyber Security, Security Risk Analysis.

UNIT – II

Introduction to Application Security and Counter Measures: Introduction to Application Security, Data Security Considerations, Security Technologies, Security Threats, Security Threats to E-Commerce, E-Cash and Electronic Payment System, Credit/Debit/Smart Cards, Digital Signature, Cryptography and Encryption.

UNIT – III

Introduction to Security Measures: Secure Information System Development, Application Development Security, Information Security Governance and Risk Management, Security Architecture and Design, Security Issues in Hardware, Data Storage, and Downloadable Devices, Physical Security of IT Assets, Backup Security Measures.

UNIT - IV

Introduction to Security Policies and Cyber Laws: Need for an Information Security Policy, Information Security Standards – ISO, Introducing Various Security Policies and Their Review Process, Introduction to Indian Cyber Law Objective and Scope of the IT Act, 2000, Intellectual

Property Issues, Overview of Intellectual-Property- Related Legislation in India, Patent, Copyright, Law Related to Semiconductor Layout and Design, Software License.

TEXT BOOKS:

1.Introduction to Information Security and Cyber Laws" by Dr. Surya Prakash Tripathi, Ritendra Goel, Praveen K. Shukla, Kogent Learning Solutions Inc. and Dreamtech Press., 2021

REFERENCE BOOKS:

1. Information Security and Cyber laws by Aatif Jamshed

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	POs												**PSOs**		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1	1	-	-	-	3	-	3	-	-	-	2	3	2	3
CO2	1	1	-	-	-	3	-	3	-	-	-	2	3	2	3
CO3	1	1	-	-	-	3	-	3	-	-	-	2	3	2	3
CO4	1	1	-	-	-	3	-	3	-	-	-	2	3	2	3

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DATABASE MANAGEMENT SYSTEMS
IV B.Tech – VII Semester (Code: OCS1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:
Students will be able to

- Familiarize with fundamental concepts of database and various database architectures and Design relations for Relational databases using conceptual data modeling
- Implement formal relational operations in relational algebra and SQL.
- Identify the Indexing types and normalization process for relational databases
- Use mechanisms for the development of multi user database applications.

Course outcomes:
Students will be able to
CO1: Ability to apply knowledge of database design methodology which give a good formal foundation in relational data model and Understand and apply the principles of data modeling using ER Model.
CO2: Familiar with relational DB theory and will able to write relational algebra expressions, Relational Calculus and SQL.for query
CO3: Design database schema and identify and solve the redundancy problem in database tables
using normalization.
CO4: Understand transaction processing, concurrency control and recovery techniques

UNIT- I

Databases and Database Users: Introduction - An Example - Characteristics of the Database Approach - Actors on the Scene - Workers behind the Scene - Advantages of Using the DBMS Approach - A Brief History of Database Applications - When Not to Use a DBMS.

Database System Concepts and Architecture: Data Models, Schemas, and Instances - Three-Schema Architecture and Data Independence - Database Languages and Interfaces - The Database System Environment - Centralized and Client/Server Architectures for DBMSs - Classification of Database Management Systems.

Data Modeling Using the Entity-Relationship (ER) Model: Using High-Level Conceptual Data Models for Database Design - An Example Database Application - Entity Types, Entity Sets, Attributes, and Keys - Relationship Types, Relationship Sets, Roles, and Structural Constraints - Weak Entity Types - Refining the ER Design for the COMPANY Database - ER Diagrams, Naming Conventions, and Design Issues.

UNIT – II

The Relational Data Model and Relational Database Constraints: Relational Model Concepts - Relational Model Constraints and Relational Database Schemas - Update Operations, Transactions, and Dealing with Constraint Violations - Relational Database Design Using ER-to-Relational Mapping.
Basics of SQL: DDL, DML and DCL Commands.

UNIT – III

Functional Dependencies and Normalization for Relational Databases: Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys - General Definitions of Second and Third Normal Forms, Boyce-Codd Normal Form.
Relational Database Design Algorithms and Further Dependencies: Properties of Relational Decompositions - Algorithms for Relational Database Schema Design – Multivalued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form.

UNIT - IV

Introduction to Transaction Processing Concepts and Theory: Introduction to Transaction Processing - Transaction and System Concepts - Desirable Properties of Transactions - Characterizing Schedules Based on Recoverability - Characterizing Schedules Based on serializability.
Concurrency Control Techniques: Two-Phase Locking Techniques for Concurrency Control - Concurrency Control Based on Timestamp Ordering – Multiversion Concurrency Control Techniques - Validation (Optimistic) Concurrency Control Techniques - Granularity of Data Items and Multiple Granularity Locking.

TEXT BOOKS:

1. "Fundamentals of Database Systems", RamezElmasri and Navate Pearson Education, 5th edition.

REFERENCE BOOKS:

1."Introduction to Database Systems", C.J.Date Pearson Education.
2. "Data Base Management Systems", Raghurama Krishnan, Johannes Gehrke, TATA McGrawHill, 3rdEdition.
3."Data base System Concepts", Silberschatz, Korth, McGraw hill, 5th edition

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes

	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO-1	1	2	2	-	-	-	-	-	-	-	-	-	-	1	-
CO-2	2	2	3	1	-	-	-	-	-	-	-	-	-	2	-
CO-3	1	2	3	1	-	-	-	-	-	-	-	-	-	1	-
CO-4	1	3	3	1	-	-	-	-	-	-	-	-	-	3	-

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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JAVA PROGRAMMING
IV B.Tech – VII Semester (Code: OCS2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:
Students will be able to

- Understand advantages of OO programming over procedural oriented programming, learn the basics of variables, operators, control statements, arrays, classes and objects.
- Understand, write and implement the following concepts: Inheritance, Interfaces, Packages, Strings and Collections
- Understand and write programs on Exception Handling, I/O, and Multithreading
- Understand and implement applications using Applets, AWT, Swings and Events.

Course outcomes:
Students will be able to
CO1: Demonstrate OOP concepts, its advantages over structured programming.
CO2: Develop and implement Inheritance, polymorphism
CO3: Analyze Exception Handling, Multithreading, I/O.
CO4: Create code for Event Handling, Applets, AWT and Swings.

UNIT- I

Introduction: Introduction to java, data types, dynamic initialization, scope and life time, operators, control statements, arrays, type conversion and casting, finals & blank finals.
Classes and Objects : Concepts, methods, constructors, usage of static, access control, this key word, garbage collection, overloading, parameter passing mechanisms, nested classes and inner classes.
Inheritance: Basic concepts, access specifires, usage of super key word, method overriding, final methods and classes, abstract classes, dynamic method dispatch, Object class.
Interfaces: Differences between classes and interfaces, defining an interface, implementing interface, variables in interface and extending interfaces.
Packages: Creating a Package, setting CLASSPATH, Access control protection, importing packages.
Strings: Exploring the String class, String buffer class, Command-line arguments.

UNIT – II

Exception Handling: Concepts of Exception handling, types of exceptions, usage of try, catch, throw, throws and finally keywords, Built-in exceptions, creating own exception sub classes.
Multithreading: Concepts of Multithreading, differences between process and thread, thread life cycle, Thread class, Runnable interface, creating multiple threads, Synchronization, thread priorities.

Applets: Concepts of Applets, life cycle of an applet, creating applets, passing parameters to applets, accessing remote applet, Color class and Graphics

UNIT – III

Event Handling: Events, Event sources, Event classes, Event Listeners, Delegation event model, handling events.
AWT: AWT Components, windows, canvas, panel, File Dialog boxes, Layout Managers, Event handling model of AWT, Adapter classes, Menu, Menu bar.

UNIT - IV

Swing-I – swings introduction, JApplet, JFrame and JComponent, Icons and Labels, text fields, buttons – The JButton class, Check boxes, Radio buttons.

JDBC Connectivity: Jdbc connectivity, types of Jdbc Drivers, connecting to the database, Jdbc Statements, Jdbc Exceptions, Manipulations on the database, Metadata.

TEXT BOOKS:

1. "The Complete Reference Java J2SE", 7th Edition, Herbert Schildt, TMH Publishing Company Ltd, New Delhi.
2. "Big Java", 2nd Edition, Cay Horstmann, John Wiley and Sons, Pearson Education..

REFERENCE BOOKS:

1." Java How to Program", Sixth Edition, H.M.Dietel and P.J.Dietel, Pearson Education/PHI.
2. "Core Java 2", Vol 1, Fundamentals, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
3. "Core Java 2", Vol 2, Advanced Features, Cay.S.Horstmann and Gary Cornell, Seventh Edition, Pearson Education.
4. "Beginning in Java 2", Iver Horton, Wrox Publications.
5. "Java", Somasundaram, Jaico.
6. "Introduction to Java programming", By Y.DanielLiang, Pearson Publication

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	2	3	-	-	-	-	-	-	-	-	-	3	3	2
CO2	3	2	3	-	-	-	-	-	-	-	-	-	3	3	2
CO3	3	2	3	-	-	-	-	-	-	-	-	-	3	3	2
CO4	3	2	3	-	2	-	-	-	-	-	-	-	3	3	2

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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DATAWAREHOUSING AND DATA MINING
IV B.Tech – VII Semester (Code: ODS1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:
Students will be able to

- Identify the scope and necessity of Data Warehousing & Mining for the society.
- Understand importance of data, data preprocessing techniques to solve the real time problems.
- Understand and implement classical models and algorithms in data warehouses and data mining.
- Develop skill in selecting the appropriate data mining algorithm for solving practical problems

Course outcomes:
Students will be able to
CO1: Understand scope and necessity of Data Warehousing & Mining for the society.
CO2: Understand, implement preprocessing techniques and classification models and develop skills in selecting appropriate preprocessing and classification algorithms.
CO3: Understand, implement classical models and develop skills in selecting appropriate association rule mining algorithms.
CO4: Understand, implement clustering models and develop skills in analyzing appropriate clustering algorithms to solve real time problems.

UNIT- I

Data Mining: Introduction, Kinds of Data, Data Mining Functionalities, Classification of DataMining Systems, Major Issues in Data Mining
Data Pre-processing: Importance of Data Process, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation

UNIT – II

Data Warehouse and OLAP Technology: Introduction, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation from Data Warehousing to Data Mining.
Data Cube Computation and Data Generalization: Efficient Methods for Data Cube Computation, Further Development of Data Cube and OLAP Technology, Attribute-Oriented Induction An Alternative Method for Data Generalization and Concept Description.

UNIT – III

Mining Frequent Patterns, Associations, and Correlations: Basic Concepts and a Road Map, Efficient and Scalable Frequent Item-set Mining Methods, Mining Various Kinds of Association Rules, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

UNIT - IV

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods- k-Means and k-Medoids, Hierarchical Methods- Agglomerative and Divisive Hierarchical Clustering, Density-Based Methods- DBSCAN, Grid-Based Methods- STING, Outlier Analysis.

TEXT BOOKS:

1. Jiawei Han Micheline Kamber – "Data Mining Concepts & Techniques", 2nd ed., Morgan Kaufmann Publishers.

REFERENCE BOOKS:

1.'"Data Warehousing in the real world – A Practical guide for Building decision support systems", Sam Anahory, Dennis Murray, Pearson Education.
2."Data Mining (Introductory and Advances Topics)", Margaret H. Dunham, Pearson Education.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	3	2	3	1	1	-	-	-	-	2	-	-	-
CO2	3	3	3	2	3	1	1	-	-	-	-	2	-	-	-
CO3	3	3	3	2	3	1	1	-	-	-	-	2	-	-	-
CO4	3	3	3	2	3	1	1	-	-	-	-	2	-	-	-

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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Social Network Analysis
IV B.Tech – VII Semester (Code: ODS2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

Students will be able to

- Understanding the motivations behind the study of social network analysis
- Relate the physical society with the online social network and understand how one shapes the other.
- Interpret the historical development of social network analysis research
- Classify the hierarchy of social structure and the terminologies needed to model the structure.

Course outcomes:

Students will be able to

CO1: Discuss the Networks Society and Network Measures

CO2: Demonstrate the Network Growth Models and Link Analysis.

CO3: Classify the Community Structure in Networks.

CO4: Demonstrate the Behavior of Social Network Effects.

UNIT- I

Networks and Society: What is Social Network Analysis?, Why do We Study Social Networks, Applications of Social Network Analysis, Preliminaries, Three Levels of Social Network Analysis, Historical Development, Graph Visualization Tools**.**

Network Measures: Network Basics, Node Centrality, Assortativity, Transitivity and Reciprocity, Similarity, Degeneracy.

UNIT – II

Network Growth Models: Properties of Real-World Networks, Random Network Model, Ring Lattice Network Model, Watts–Strogatz Model, Preferential Attachment Model, Price's Model, Local-world Network Growth Model, Network Model with Accelerating Growth, and Aging in Preferential Attachment.

Link Analysis: Applications of Link Analysis, Signed Networks, Strong and Weak Ties, Link Analysis Algorithms, Page Rank, Personalised Page Rank, DivRank, SimRank, PathSIM

UNIT – III

Community Structure in Networks: Applications of Community Detection , Types of Communities, Community Detection Methods, Disjoint Community Detection, Overlapping Community Detection, Local Community Detection, Community Detection vs Community Search,Evaluation of Community Detection Methods.

Link Prediction: Applications of Link Prediction,Temporal Changes in a Network ,Problem , Evaluating Link Prediction Methods, Heuristic Models, Probabilistic Models, Supervised Random Walk, Information-theoretic Model, Latest Trends in Link Prediction,

UNIT - IV

Cascade Behaviours and Network Effects: Preliminaries and Important Terminologies, Cascade Models, Case Study – The "Indignados" Movement, Probabilistic Cascades,Epidemic Models, Independent Cascade Models, Anomaly Detection in Networks, Graph Representation Learning

TEXT BOOKS:

1.Social Network Analysis, Tanmoy Chakraborty, Wiley, 2021
2.Network Science, Albert-Lazzlo Barabas

REFERENCE BOOKS:

1.'" Social Network Analysis: Methods and Applications, Stanley Wasserman, Katherine Faus

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1	1	-	2	-	2	-	-	-	-	-	-	1	-	-
CO2	1	2	-	2	1	-	1	1	-	-	-	-	1	1	-
CO3	2	2	-	1	1	1	1	-	-	-	-	-	1	-	1
CO4	2	2	-	1	1	1	1	-	-	-	-	-	1	2	1

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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DIGITAL IMAGE PROCESSING

IV B.Tech – VII Semester (Code: OEC1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives: To make the students

- Recall and summarize the digital image fundamentals and to be exposed to basic imageprocessing techniques.
- Illustrate various filtering techniques for images in terms of spatial and frequency domain.
- Be familiar with image restoration enhancement.
- To understand the importance of Color image processing techniques.

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

CO1: Understand the digital image fundamentals and basic image processing techniques.
CO2: Apply appropriate technique for image enhancement in both spatial and frequency domains.
CO3: Compare various Image Restoration techniques.
CO4: Analyze various Color image processing operations and Evaluate Image compression using different coding techniques

UNIT – I

INTRODUCTION: What Is Digital Image Processing? The Origins of Digital Image Processing,Examples of Fields that Use Digital Image Processing, Fundamental Steps in Digital Image Processing, Components of an Image Processing System.
DIGITAL IMAGE FUNDAMENTALS: Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization, Some Basic Relationships between Pixels.

UNIT – II

SPATIAL AND FREQUENCY DOMAIN FILTERING: Background. Some Basic Intensity Transformation functions, Histogram Processing, Fundamentals of Spatial Filters, Smoothing Spatial Filters, Sharpening Spatial Filter.The basics of filtering in the Frequency Domain, Image smoothing using frequency domain filters, Image sharpening using frequency domain filters.

UNIT – III

IMAGE RESTORATION: A Model of the Image Degradation/Restoration Process, Noise Models, Restoration in the Presence of Noise Only-Spatial Filtering, Periodic Noise Reduction by Frequency Domain Filtering, Inverse Filtering, Minimum Mean Square Error (Wiener) Filtering.

UNIT – IV

COLOR IMAGE PROCESSING: Color Fundamentals, Color Models, Pseudocolor ImageProcessing, Basics of Full-Color Image Processing.

IMAGE COMPRESSION: Fundamentals, Compression Model, Huffman coding, Arithmeticcoding, LZW coding, Run length coding.

TEXT BOOKS:

1. R. C. Gonzalez, R. E. Woods, Digital Image Processing 4th Edition, Pearson EducationPublishers, 2019.
2. Milan Sonka, Vaclav Hlavac and Roger Boyle, Image Processing Analysis and MachineVision,Thomson learning, Second Edition, 2001.

REFERENCE BOOKS:

1. S Jayaraman, S Esakkirajan, T Veerakumar, Digital Image Processing, Mc-Grah HillPublications, 2010.
2. S.Sridhar, Digital Image Processing, Oxford University Press, 2016.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	3	-	-	-	-	-	-	-	-	-	-	-	-	2
CO2	2	2	2	3	2	-	-	-	-	-	-	-	-	-	3
CO3	2	2	2	3	2	-	-	-	-	-	-	-	-	-	3
CO4	2	2	2	3	2	-	-	-	-	-	-	-	-	-	3

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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EMBEDDED SYSTEM & DESIGN

IV B.Tech – VII Semester (Code: OEC2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

The main objectives of this course are:

- To impart basic design and architectural concepts of embedded systems.
- To impart the concepts of Real-Time Operating Systems.
- To provide fundamentals of prevalent IP-Core: ARM Cortex M3/M4
- To explain the instruction set of the ARM Cortex M3/M4 processor

Course Outcomes: On successful completion of this course students will be able to:

CO1: Have a basic understanding of different methodologies and approaches in the designof embedded systems.

CO2: Understand the requirements, and concepts of Real-Time Operating systems forreal-time task processing.

CO3: Analyze the basic concepts, architecture, memory management unit, and features ofEmbedded Processors.

CO4: Understand the basic concepts of the ARM instruction set.

UNIT – I

Embedded Systems Design: Introduction to Embedded System, categories of embedded system, specialties, and recent trends in Embedded Systems.

Architecture of an Embedded System: Hardware Architecture, Software Architecture

UNIT – II

Overview of RTOS: Architecture of the Kernel, Tasks, Task scheduler, real-time tasks, Task scheduling, Interrupt Service Routine, Memory Management, Semaphores, Mutex, Mailboxes, Message Queues, Event Registers, and Pipes.

Classification of scheduling algorithms: Clock-driven Scheduling, Event-driven Scheduling, Resource sharing, Priority inversion problem, Deadlock.

UNIT – III

Embedded Processors: Introduction to ARM family, ARM Architecture - Pipeline, Registers, Operation modes, Big Endian and Little Endian. Cache Mechanism, Memory Management Unit.

UNIT – IV

ARM Instructions: ARM and Thumb Instruction Sets, Data Processing Instructions, Data Transfer Instructions, and Control Flow Instructions.

TEXT BOOKS:

1.KVKK Prasad, "Embedded/Real Time Systems" Dream tech Press, 2005.
2. Andrew N. Sloss/ Dominic Symes/ Chris Wright, "ARM System Developer's Guide Designing and Optimizing" Elsevier, 2004.

REFERENCE BOOKS:

1.Frank Vahid / Tony Givargis, "Embedded System Design A unified Hardware / SoftwareIntroduction" John Wiley & Sons, Inc.
2.Jonathan W Valvano, "Embedded Systems: Real-Time Operating Systems for ARM Corte-M Microcontrollers" Create Space, Volume 3, 5th Edition, 2019.

ONLINE SOURCES:

http://users.ece.utexas.edu/~valvano/
http://www.nptelvideos.in/2012/11/embedded-systems.html
https://developer.arm.com/ip-products/processors/cortex-m/cortex-m3

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	1	-	-	-	-	-	-	-	-	-	-	-	-	3
CO2	2	3	-	2	-	-	-	-	-	-	-	-	-	-	3
CO3	2	2	2	3	-	-	-	-	-	-	-	-	-	-	3
CO4	2	3	2	3	-	-	-	-	-	-	-	-	-	-	3

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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NON-CONVENTIONAL ENERGY SOURCES

IV B.Tech – VII Semester (Code: OEE1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives: To make the students at the end of the course

- Acquire knowledge about alternate energy sources.
- Discuss concepts of different solar generation techniques.
- Gain knowledge about wind energy conversion.
- Describe generation of energy from Ocean and Geothermal connectivity

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

CO1: Describe the Importance of Non- conventional Energy sources.

CO2: Construct different types of solar power generation systems.

CO3: Explain the working of different wind power plants.

CO4: Demonstrate Ocean and Geothermal energy generation.

UNIT – I

Principle of Renewable Energy: Comparison of renewable and conventional energy sources - Ultimate energy sources - natural energy currents on earth - primary supply to end use - Spaghetti & Pie diagrams - energy planning - energy efficiency and management.

UNIT – II

Solar Radiation: Extra-terrestrial solar radiation - terrestrial solar radiation - solar thermal conversion - solar thermal central receiver systems - photovoltaic energy conversion - solar cells – 4 models.

UNIT – III

Wind energy: Planetary and local winds - vertical axis and horizontal axis wind mills - principles of wind power - maximum power - actual power - wind turbine operation - electricalgenerator.

UNIT – IV

Energy from Oceans: Ocean temperature differences - principles of OTEC plant operations - wave energy - devices for energy extraction – tides - simple single pool tidal system.

Geothermal energy: Origin and types - Bio fuels – classification - direct combustion for heat and electricity generator - anaerotic digestion for biogas - biogas digester - power generation.

TEXT BOOK:

1. G.D.Rai ,Non-Conventional Energy Sources, Khanna Pubulications, 6th edition, 1988.
2. B H Khan, Non-Conventional Energy Resources, McGraw Hill Education, 2nd edition, 2009.

REFERENCE BOOKS:

1. John Twidell & Toney Weir: Renewable Energy Resources 3rd Edition, 2015.
2. Krzysztof (Kris) Iniewski, Smart Grid Infrastructure & Networking,1st edition,2013.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	3	3	3	2	-	3	-	-	-	-	1	3	0	2
CO2	2	3	3	3	2	-	3	-	-	-	-	1	3	0	2
CO3	2	3	3	3	2	-	3	-	-	-	-	1	3	0	2
CO4	2	3	3	3	3	-	3	-	-	-	-	1	3	0	2

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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ELECTRICAL ENERGY CONSERVATION AND AUDITING

IV B.Tech – VII Semester (Code: OEE2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives: To make the students

- Global and Indian energy scenario, auditing principles &guidance for implementation.
- Identify the performance of electrical motors and systems under various conditions.
- Know the Performance evaluation techniques of electrical equipment such as motors and lighting system.
- Usage of energy conservation in various industrial and financial analysis

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

CO1: Illustrate Global and Indian energy scenario, Energy management and Auditing principles and effective energy management.
CO2: Make use of efficient electrical motors and systems under distinct situations.
CO3: Develop lighting system and energy conservation building code for energy saving opportunity.
CO4: Take part in financial of energy conservation opportunities in electrical and industrial utilities.

UNIT-I

Energy Scenario: Primary and secondary energy, commercial energy and non-commercial energy, Renewable and non -renewable energy, Purchase power parity(PPP), energy conservation; Energy audit-Types and objective; Energy performance; Instruments and metering for energy audit; project management - PDC & PPT.

UNIT-II

Electrical Motors: Motor- Types, characteristics, efficiency, selection; Energy efficient motors, Factors affecting motor efficiency, rewinding efficiency, speed control, Star labelling

HVAC and Refrigeration system: Psychometrics' and air conditioning process; refrigeration-types, properties, selection, factors affecting performance, performance assessment- plants, window, split and package air conditioning.

UNIT-III

Lighting System: basic parameters and terms in lighting system, light source and lamp types, Illuminance - levels, methods of calculating, general energy saving opportunities, energy

efficient lighting controls, standards and labelling programs for FTL lamps and lighting case study

Energy Conservation in Building and ECBC: Energy conservation amendment; Energy conservation building code(ECBC)- Approaches, guidelines on building envelope, heating ventilation, air conditioning system, service hot water, lighting and electrical power; building management system(BMS) ; Star rating of building; Energy efficiency measures in building.

UNIT-IV

Energy Performance Systems: Cogeneration systems-purpose of the performance test, terms and definitions, standards, field testing procedure, numerical, case study of bottoming cycle cogeneration in a cement industry.

Financial: Financial Analysis- Introduction, fixed and variable costs, interest charges, simple payback period, discounted cash flow methods, factors affecting analysis

TEXT BOOKS:

1. Clive Beggs. Energy Management supply and conservation.,Routledge, 2nd Ediition, 2009.
2. Anil kumar, Om Prakash, Prashant singh chauhan, and Samsher gautham. Energy Management conservation and Audits., CRC Press, 1st Edition,2022

REFERENCE BOOKS:

1. Sonal Desai. Handbook of energy audit. McGraw Hill Education,1st Edition, 2015
2. Zoran K. Morvay and Dusan Gvozdenac. Applied industrial energy and environment management .,Wiley-IEEE Press,1st Edition, 2008
3. Linda Reeder. Guide to green building rating systems.Wiley, 1st Edition, 2010.

WEB RESOURCE LINKS:

1. **https://beeindia.gov.in/en/programmesnational-certification-examination/energy-auditors**

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	3	-	-	3	3	-	-	-	-	1	3	-	-
CO2	3	3	3	-	-	3	1	-	-	-	-	1	3	-	-
CO3	3	3	3	-	-	3	3	-	-	-	3	1	3	-	-
CO4	3	3	2	-	-	3	3	-	-	-	3	1	3	-	-

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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INDUSTRIAL ELECTRICAL SYSTEMS
IV B.Tech – VII Semester (Code: OEE3)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives: To make the students

- Explain the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.
- Discuss various components of industrial electrical systems.
- Estimate and select the proper size of various electrical system components.
- Solve problems involving with different AC and DC sources in electrical circuits.

Course Outcomes: After completion of this course, students will be able to

CO1: Demonstrate the electrical wiring systems for residential, commercial and industrial consumers, representing the systems with standard symbols and drawings, SLD.

CO2: Infer and outline various components of industrial electrical systems.

CO3: Apply and analyse the selection the proper size of various electrical system components.

CO4: Illustrate and solve problems involving with different AC and DC sources in electrical circuits.

UNIT - I

Electrical System Components: LT system wiring components, selection of cables, wires, switches, distribution box, metering system, Tariff structure, protection components- Fuse, MCB, MCCB, ELCB, inverse current characteristics, symbols, single line diagram (SLD) of a wiring system, Contactor, Isolator, Relays, MPCB, Electric shock and Electrical safety practices.

Residential and Commercial Electrical Systems: Types of residential and commercial wiring systems, general rules and guidelines for installation, load calculation and sizing of wire, rating of main switch, distribution board and protection devices, earthing system calculations, requirements of commercial installation, deciding lighting scheme and number of lamps, earthing of commercial installation, selection and sizing of components.

UNIT - II

Illumination Systems: Understanding various terms regarding light, lumen, intensity, candle power, lamp efficiency, specific consumption, glare, space to height ratio, waste

light factor, depreciation factor, various illumination schemes, Incandescent lamps and modern luminaries like

CFL, LED and their operation, energy saving in illumination systems, design of a lighting scheme for a residential and commercial premises, flood lighting.

UNIT - III

Industrial Electrical Systems I: HT connection, industrial substation, Transformer selection, Industrial loads, motors, starting of motors, single line diagram, Cable and Switchgear selection, Lightning Protection, Earthing design, Power factor correction – kVAR calculations, type of compensation, Introduction to PCC, MCC panels. Specifications of LT Breakers, MCB and other LT panel components.

UNIT – IV

Industrial Electrical Systems II: DG Systems, UPS System, Electrical Systems for the elevators, Battery banks, Sizing the DG, UPS and Battery Banks, Selection of UPS and Battery Banks.

Industrial Electrical System Automation: Study of basic PLC, Role of in automation, advantages of process automation, PLC based control system design, Panel Metering and Introduction to SCADA system for distribution automation.

TEXT BOOKS:

1. J. B. Gupta, A Course in Electrical Installation Estimating and Costing, S.K. Kataria & Sons, ISBN-10-9350142791, 2013.
2. K. B. Raina, Electrical Design, Estimating & Costing, New age International, 2nd Edition, 2017.

REFERENCE BOOKS:

1. Surjit Singh, Electric Estimating and Costing, Dhanpat Rai and Co., ASINB01MZAPVO4, 2016.
2. S. L. Uppal and G. C. Garg, "Electrical Wiring, Estimating & Costing", Khanna publishers, ISBN: 9788174092403, 9788174092403, 2008.
3. H. Joshi, Residential, Commercial and Industrial Electrical Systems Equipment and Seelection, McGraw Hill Education, ISBN: 0070620962, 2007.

NPTEL COURSE LINKS:

1. https://nptel.ac.in/courses/108101167

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	-	-	-	-	-	-	-	1	3	2	-
CO2	3	3	2	-	-	-	-	-	-	-	-	1	3	2	-
CO3	3	3	2	-	-	-	-	-	-	-	-	1	3	2	-
CO4	3	3	2	-	-	-	-	-	-	-	-	1	3	2	-

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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SENSORS AND SIGNAL CONDITIONING
IV B.Tech – VII Semester (Code: OEI1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives: Students will be able to

- Describe the basic sensors, their static and dynamic characteristics, primary sensors for physical quantities, working principles of resistive sensors and various methods of signal conditioning of resistive sensors.
- Study various reactive variation sensors and design of signal condition circuits for these sensors.
- Know various self generating sensors and design of signal condition circuits for these sensors.
- Understand the working principles of various digital and intelligent sensors

Course Outcomes: Students will be able to

CO1: Determine a required sensor for a particular application and to design signal conditioning circuit for that variable.
CO2: Design signal conditioning circuits for a given reactive sensor
CO3: Choose the specifications of an active sensor for a control application and to design the signal conditioning circuit
CO4: Design digital signal conditioning circuits for a physical quantity measured

UNIT-1

Introduction to Sensor based measurement systems: General concepts and terminology, sensor classification, general input-output configuration, static and dynamic characteristics of measurement systems, primary sensors.

Resistive sensors: Potentiometers, strain gauges, resistive temperature detectors, thermistors.

Signal conditioning for resistive sensors: Measurement of resistance, voltage dividers, Wheatstone bridge balance measurements, Wheatstone bridge deflection measurements, differential and instrumentation amplifiers, interference.

UNIT-II

Reactance variation and electromagnetic sensors: Capacitive sensors, inductive sensors-variable reluctance sensors, eddy current sensors, linear variable differential transformer, electromagnetic sensors.

Signal conditioning for reactance variation sensors :Problems and alternatives, ac bridges, carrier amplifiers and coherent detection, specific signal conditioning for capacitive sensors.

UNIT-III

Self generating sensors : Thermocouples, piezo-electric sensors, photovoltaic sensors, electro-chemical sensors.

Signal conditioning for self generating sensors : Chopper and low-drift amplifiers, electrometer and transimpedance amplifiers, charge amplifiers, noise in amplifiers, noise and drift in resistors.

UNIT-IV

Digital and Intelligent sensors: Position encoders, resonant sensors, variable oscillators, conversion to frequency, period or time duration, direct sensor-microcontroller interfacing, communication systems for sensors, Intelligent sensors

Text Books :

1.Raman Pallas Areny, John G. Webster : Sensors and signal conditioning, second edition, John Wiley and sons.

References :

1.Walt Kester: Practical design techniques for sensor signal conditioning, Analog devices, Prentice Hall.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2														
CO2			2		2									3	2
CO3			3		3									3	2
CO4		2		2											

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CYBER SECURITY

IV B.Tech – VII Semester (Code: OIT1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

To make the students

- Understand the Security mechanisms.
- Understand secure communication using Cryptographic algorithms.
- Understand basics of Hacking and Privacy.
- Understand Network security and System security.

Course Outcomes:

After successful completion of this course, student will be able to:

CO1:Explain security mechanisms.

CO2:Explain the applications of Cryptographic algorithms in Cyber Security.

CO3:Explain hacking and privacy.

CO4:Explain network and system security.

UNIT – I

Introduction to Computer Security: Definition of Computer Security, the OSI Security Architecture, Security Attacks, Security Services, Security Mechanisms and A Model for Network Security.

Symmetric Ciphers: Classical Encryption Techniques, Block Ciphers and the DES, AES Techniques.

UNIT – II

Public Key Cryptography: Principles of Public-Key Cryptosystems, The RSA algorithm and Diffie Hellman Key Exchange Algorithm.

Digital Signatures: Properties, Attacks and Forgeries, Digital Signature Requirements, Direct Digital Signature and Elgamal Digital Signature Scheme.

UNIT – III

Hacking: Basic Terminology, Hacker's Motives and Objectives, Hacker Classes, Hacking Phases and Role of an Ethical Hacker.

Privacy in Cyberspace: Privacy Concepts, Privacy Principles and Policies, Privacy on the Web, Email Security, Privacy Impacts of Emerging Technologies.

UNIT – IV

Information Gathering Tools: Recon-ng, Dmitry, Net discover and Nmap.

Network Scanning: Objectives of Network Scanning, TCP/IP protocol stack, Types of Network Scanning.

Security of Computer Systems: Malware attacks, Password attacks.

TEXTBOOKS:

1. Cryptography and Network Security - Principles & Practice, William Stallings, Pearson, 7th edition, 2017. ISBN: 978-0-13-444428-4.

REFERENCE BOOKS:

1. Harvey M. Cryptography and Network Security, Behrouz A. Forouzan and Debdeep Mukhopadhyay, McGraw-Hill Education, 2nd edition, 2010. ISBN: 978-93-392-2094-5
2. CISSP All-in-One Exam Guide, Shon Harris and Fernando Maymi, McGraw-Hill Education, 7th edition, 2016, ISBN: 978-0-07-184961-6.
3. Gray Hat Hacking: The Ethical Hackers Handbook, Allen Harper, Shon Harris, McGraw-Hill Edition, 3rd edition, 2011. ISBN: 978-0-07-174256-6
4. Security in Computing, Charles P. Pfleeger Shari Lawrence Pfleeger Jonathan Margulies, Pearson Edition 5th edition, 2015. ISBN: 78-0-13-408504-3.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	2	2	3	2	3					2	2	2			
CO2	2	3	2	2	2					2	2	2			
CO3	2	2	2	2	2					2	2	2			
CO4	2	2	2	2	2		2	2		2		2			

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WEB TECHNOLOGIES

IV B.Tech – VII Semester (Code: OIT1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

To make the students to

- Familiarize with HTML elements and their attributes.
- Familiarize with client-side programming.
- Write a well formed / valid XML document.
- Understand Web Server and its working.
- Use Ajax for asynchronous communication.

Course Outcomes:

After successful completion of this course, student will be able to:

CO1:Design web pages with different HTML elements and its attributes.

CO2: Build dynamic web pages using Java Script.

CO3:Write a well-formed and valid XML document.

CO4:Build a simple Ajax application and create a simple animation using jQuery.

UNIT – I

HTML5: Fundamentals of HTML, Working with Text, Organizing Text in HTML, Working with Links and URLs, Creating Tables, Working with Images, Colours, and Canvas, Working with Forms.

UNIT – II

CSS: Overview of CSS, Backgrounds and Colour Gradients in CSS, Fonts and Text Styles, Creating Boxes and Columns Using CSS, Displaying, Positioning, and Floating an Element, List Styles, Table Layouts. Dynamic HTML: Overview of JavaScript, JavaScript Functions, Events, Image Maps, and Animations.

UNIT – III

Dynamic HTML(Cont..): JavaScript Objects, Working with Browser Objects, Working with Document Object. Document Object Model: Understanding DOM Nodes, Understanding DOM Levels, Understanding DOM Interfaces - Node, Document, Element, Attribute.

UNIT –IV

XML: Working with Basics of XML, Implementing Advanced Features of XML, Working with XSLT. AJAX: Overview of AJAX, Asynchronous Data Transfer with XMLHttpRequest, Implementing AJAX Frameworks, Working with jQuery.

TEXTBOOKS:

1. Kogent Learning Solutions Inc., HTML5 Black Book: "Covers CSS3, Javascript, XML, XHTML, Ajax, PHP and Jquery".

REFERENCE BOOKS:

5. Harvey M. Deitel and Paul J. Deitel, "Internet & World Wide Web How to Program", 4/e, Pearson Education.
6. Jason Cranford Teague, "Visual Quick Start Guide CSS, DHTML &AJAX", 4e, Pearson Education.
7. Tom Nerino Doli smith, "JavaScript & AJAX for the web", Pearson Education 2007.
8. Joshua Elchorn, "Understanding AJAX", Prentice Hall 2006.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1		2	2	1					1	2	3	2			
CO2			1							1		3			
CO3			1												
CO4		2	3	2		1	2	1	2	2	3	3			

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AUTOMOBILE ENGINEERING

IV B.Tech – VII Semester (Code: OME1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

To make the students to

- Familiarize the fundamentals of Engine Components, Chassis and suspension system, braking and transmission system, and cooling and lubrication system.
- Develop a strong base for understanding future developments like hybrid and electric vehicles in the automobile industry.

Course Outcomes:

After successful completion of this course, student will be able to:

CO1: List different types of Vehicles and their applications.

CO2:Define working of Automobile Engine cooling and lubrication system.

CO3:Describe functioning of Ignition system and its accessories.

CO4:Describe functioning of Transmission, Steering, and Braking and Suspension system

UNIT-I

INTRODUCTION: Classification of vehicles – applications, valves, valve arrangements and operating Mechanisms, Piston - design basis, types, piston rings, firing order; Crankshafts, Flywheel, Air and Fuel Filters, Mufflers.

FUEL SUPPLY SYSTEMS: Fuel supply pumps, Mechanical and Electrical type Diaphragm pumps.

COOLING SYSTEMS: Need for cooling system, Air and water cooling, Thermal syphon cooling systems

UNIT-II

LUBRICATING SYSTEMS: Various lubricating systems for I.C. Engines.

ELECTRICAL SYSTEM: Ignition system, Spark plugs, Distributor, Electronic Ignition, Alternator, cutout, Current and voltage regulators, charging circuit, starting motors, lighting, instruments and accessories.

CHASSIS: Introduction, Construction, Requirements of Chassis.

UNIT-III

TRANSMISSION: Gear Box - Theory, Four speed and Five Speed Sliding Mesh, Constant mesh & synchromesh type, selector mechanism, automatic transmission, overdrive, propeller shaft, differential - principle of working.

SUSPENSION SYSTEMS: Need for suspension systems, springs, shock absorbers, axles – front and rear, different methods of floating rear axle, front axle and wheel alignment.

UNIT-IV

VEHICLE CONTROL: Steering mechanisms and power steering, types of brakes and brake actuation mechanisms (air and hydraulic).

ELECTRIC, HYBRID AND FUEL CELL VEHICLES: Layout of electric and hybrid vehicles – Advantages and drawbacks, System Components, Electronic control system, Different configurations of electric and hybrid vehicles hybrid vehicles, Power split device, High energy and power density batteries – Basics of fuel cell vehicles.

TEXT BOOKS

1. Automobile Engineering - G.B.S.Narang.
2. Automobile Engineering -R.B.Gupta
3. Automobile Engineering - Vol I & II - Kirpal Singh

REFERENCE BOOKS

1. Automotive Mechanics - Joseph Heitner
2. Automobile Engineering -S. Srinivasan

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	2										2	1		
CO2	3	2	1		2	2		2		3		2	2	2	
CO3	3	2	2	1						2		2	2	1	1
CO4	2	3	3	2	2	2	3		1		1	2	2	2	3

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RENEWABLE ENERGY SOURCES

IV B.Tech – VII Semester (Code: OME2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

- To enable students to identify different sources of non conventional energy and innovative Technologiesin harnessing energy from these sources.
- Understand the energy conversion from wind energy, geothermal energy, Biomass, biogas, fuel cells.
- Understand the advantages and limitations of different non conventional energy sources and identify awide variety of applications for non conventional energy.

Course Outcomes: At the end of the course, the student will be able to

CO1: Understand different methods of exploiting solar energy.

CO2: Understand the principles and energy conversion from wind and geo thermal sources

CO3: Gain knowledge in exploring the energy from ocean, tidal and bio-mass

CO4: understand the techniques in power generation using Fuel cells, bio gas and MHD

UNIT-I

Various non-conventional energy resources- Introduction, availability, classification, relative merits and demerits

Solar Energy: Extra terrestrial solar radiation - terrestrial solar radiation –solar radiations on earth-measurementof solar radiations-solar constant-solar collectors-flat plate collectors-concentrating collectors-solar thermalconversion-solar thermal central receiver systems - photovoltaic energy conversion - solar cells-applications of solar energy

UNIT-II

Wind energy: Availability of wind energy in India, site selection-Components of wind energy conversion systems-Classification of wind energy conversion systems-vertical axis and horizontal axis wind turbines- Performance characteristics-Betz criteria coefficient-applications of WECS-environmental aspects

Geo thermal Energy: Structure of earth's interior-geothermal sites-geothermal resources-Site selection for geothermal power plants-Principle of working-various types of geothermal power plants- applications

UNIT-III

Ocean thermal energy conversion (OTEC): Principle of ocean thermal energy conversion-Open cycle andclosed cycle OTEC plants-Merits and demerits

Tidal Power: Tides and waves as sources of energy-fundamentals and use of tidal energy-limitations of tidalenergy conversion system

Bio mass: Availability of biomass and its conversion techniques-bio mass gasification-bio mass resourcedevelopment in India

UNIT-IV

Bio Gas: Bio gas production, aerobic and anaerobic bio conversion process-Properties of bio gas-classification of biogas plants-advantages and disadvantages-bio gas applications

Fuel Cells: Classification, Principle of working of various types of fuel cells, merits and demerits, future potentialof fuel cells.

Magneto-Hydrodynamics (MHD): Principle of working of MHD Power plant, Classification, advantages anddisadvantages.

Energy storage methods- **Batteries,** super capacitors, **compressed air,** superconducting magnet energy storage, Regenerative fuel cell storage.

TEXT BOOK:

1. H.P. Garg& Jai Prakash, Solar Energy: Fundamentals and Applications, Tata McGraw Hill,New Delhi
2. Non-Conventional Energy Sources by G.D.Rai, Khanna Publisher
3. B H Khan, "Non-Conventional Energy Resources", 2nd Edition, Tata McGraw Hill Education Pvt Ltd, 2011

REFERENCE BOOKS:

1. Power plant technology by EL-Wakil, McGraw-Hill.
2. Renewable Energy Sources by John Twidell& Toney Weir: E&F.N. Spon

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1		2		2			2	1					2	1
CO2			2				2								
CO3		1			1				1			1		1	1
CO4	3		2		2	2				2		2			2

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PROJECT MANAGEMENT

IV B.Tech – VII Semester (Code: OME3)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

The course is aimed at project planning and control before implementing any project.

The objectives are,

- To acquire the knowledge of planning a project.
- To perform SWOT analysis of project
- To use PERT and CPM techniques in implementing a project
- To learn to manage a project
- To control the project and evaluate it.

Course Outcomes:

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

CO1:Develop work breakdown structure

CO2:Apply critical path, risk analysis using PERT Methods

CO3:Apply scheduling of resources for a given project purpose relevant cost

CO4:Develop organisation structure for a project &identify the appropriate leadership style

UNIT - I

Introduction to Project Management - Definitions, scope and contents, Relevance, Classification of Projects, Defining the Project,Project Life Cycle, WBS, Project Life cycle, Developing a project Plan, Network analysis, Exercises

UNIT - II

Critical path method, Risk analysis, PERT; problems, Reducing Project Duration

UNIT - III

Estimating project Times and Costs, Scheduling Resources and Costs, problem solving, Progress and Performance Measurement

UNIT - IV

Organization – Structure and Culture, Designing a structure for a project, Leadership styles, Leading, Managing Project Teams. The Project Management Maturity Model (PMMM)

TEXT BOOKS

1. Harold Kerzner, "*Project Management*", 8th Edition, Wiley, New York, 2003. (pdf available)
2. Project Management: The Managerial Process, Erik W. Larson, and Clifford F. Gray. McGraw-Hill Higher Education

REFERENCE BOOKS

1. A Guide to the Project Management Body of Knowledge (PMBOK guide), PMI, 2017
2. Prasanna Chandra, "*Projects – Planning, analysis, selection, implementation and review*",Tata McGraw-Hill, New Delhi, 2010.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	1		3		2			2	1					2	1
CO2			2				2				3				
CO3		1	2		1				1			1		1	1
CO4	3		2		2	2				2		2			

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ENTREPRENEURSHIP DEVELOPMENT

IV B.Tech – VII Semester (Code: OME4)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

- To develop and strengthen the basic entrepreneurship knowledge for students
- To impart basic entrepreneurial skills and understanding to run a business efficiently and effectively.
- To develop skills for registering a company and gain the knowledge on sources offunds and Establishing distribution network
- To make the student aware MSMEs, Role and schemes of government in establishing enterprises in general and women entrepreneurship, social entrepreneurship in specific.

Course Outcomes:

Upon completion of the course, students will be able to

CO1:Understand the meaning of entrepreneur and able to visualize the benefits of being an entrepreneur

CO2: Unearth the entrepreneurial qualities hidden in them and apply them to the entrepreneurial activities

CO3:Understand the procedure for registering a company and gain the knowledge onsources of funds and Establishing distribution network

CO4:Realize the importance of MSMEs and the government support, formation and the characteristics of women entrepreneurship and social entrepreneurship

UNIT 1

ENTREPRENEURSHIP

Evolution of the concept of entrepreneurship, Meaning of Entrepreneur, functions of an entrepreneur, types of entrepreneurs, and stages in entrepreneurial process.

Role of entrepreneurs in economic development, possible value creation by an enterprise - direct and indirect employment, government revenue, value to consumers in terms of quality products and services, export and import substitution.

Challenges and opportunities of entrepreneurship – risk, return, professional fulfilment, spinoffs from academia – the Indian and global scenario, Factors Affecting Entrepreneurial growth.

UNIT-II

FORMULATION OF BUSINESS UNIT:

Building and Leading Effective Team. Selecting a balanced team and related issues. important Tasks for

Starting a New Business.

Market Research, identification of business opportunities, Identifying the products and/ or services, deciding on geographical location Market Feasibility study; technical, financial, and social feasibility study.

Enterprise in project mode; identification, selection, project report need and significance; Project Appraisal Methods.

UNIT-III

STARTING A BUSINESS UNIT: Form of business organization, naming and registering/ incorporating a company,

Raising funds, Sources of Fund, Raising loan fund, seed fund, equity capital, sources of grants/subsidies and margin money, loan restructuring and other concessions available to financially weak business units.Banking sources; Non-banking Institutions and Agencies.

Establishing distribution network, branding and acquiring strategic assets, product pricing Critical Success and Failure Factors. Legal Issues of Business, Corporate Governance and Business Ethics.

UNIT-IV

MICRO, SMALL AND MEDIUM ENTERPRISES (MSMEs): Definition and

Significance in Indian Economy; MSME Schemes, Challenges and Difficulties in availing MSME Schemes.

ENTREPRENEURSHIP DEVELOPMENT AND GOVERNMENT: Role of CentralGovernment and State Government in promoting Entrepreneurship - Introduction to various incentives, subsidies and grants - Export Oriented Units - Fiscal and Tax concessions available; Central/State agencies in the Entrepreneurship development.

WOMEN ENTREPRENEURSHIP:

Concept of women entrepreneurship-Reasons for growth of woman entrepreneurship- Problems faced by them and remedial measures

SOCIAL ENTREPRENEURSHIP: Definition, types, examples, issues.

TEXT BOOKS

1. Khanka. S.S., -Entrepreneurial Development‖ Chand& Co. Ltd., Ram Nagar, New Delhi, 2013.
2. Donald F Kuratko, -Entrepreneurship-Theory, Process and Practice‖, 9th Edition, Cengage Learning, 2014.
3. Raj Shankar, -Entrepreneurship: Theory and Practice‖,Vijay Nicole imprints Ltd in collaboration with Tata McGraw Hill Publishing Co. Ltd., New Delhi, 2012.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1		2	1	2	1	2	2	2	1	2	1	2	1		1
CO2	1	2	2	2	1	1	2	2	2	3	3	3	2	2	2

CO3		1						2	1	3	2	2	1		
CO4		1						2	1	3	2	2	1		

CHEMISTRY IN SPACE TECHNOLOGY
IV B.Tech – VII Semester (Code: OCY1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

- Understand the fundamental principles of chemistry applicable to space technology.
- Explore the role of chemistry in propulsion systems and materials used in space exploration.
- Analyze the chemistry of planetary atmospheres, celestial bodies, and space environments.
- Examine the impact of space technology on Earth's chemistry and environmental systems.

Course Outcomes:

CO1: Understand the fundamental principles of chemistry applicable to space technology and Chemical Analysis Techniques for Space Missions

CO2: Explore the role of chemistry in propulsion systems and materials and Materials Chemistry in Spacecraft Design

CO3: Analyze the chemistry of planetary atmospheres, celestial bodies, and space environments and Surface Chemistry of Celestial Bodies.

CO4: Examine the impact of space technology on Earth's chemistry and environmental systems and Space Debris and Environmental Impact

UNIT I

Fundamentals of Chemistry in Space Technology

Introduction to Space Chemistry: Basics of interstellar chemistry, Impact of cosmic abundances on space chemistry

Chemical Analysis Techniques for Space Missions: Spectroscopy in space exploration, Chromatography for in-situ analysis

UNIT II

Chemistry in Propulsion Systems and Materials

Chemistry of Rocket Propellants: Combustion reactions in different propulsion systems, Green propellants and energetic materials

Materials Chemistry in Spacecraft Design: Polymer chemistry in space materials, Nanomaterials for space applications

UNIT III

Chemistry of Planetary Atmospheres and Celestial Bodies

Planetary Atmospheric Chemistry: Atmospheric composition and reactions on planets, Chemistry of moon rocks and surface materials

Surface Chemistry of Celestial Bodies: Chemistry of comets and asteroids, Surface mineralogy and geochemistry

UNIT IV

Impact of Space Technology on Earth's Chemistry

Space Technologies and Environmental Monitoring: Environmental monitoring using satellite observations, Space-based sensors for air and water quality analysis

Space Debris and Environmental Impact: Chemical composition of space debris, Strategies for mitigating space debris and its environmental impact

Text Books

1. "Chemistry of Space" by J.M.T. Thompson and P.J. Gunkel
2. Astrochemistry: From Astronomy to Astrobiology" by Andrew M. Shaw
3. "Introduction to Astrochemistry: Chemical Evolution from Interstellar Clouds to Star and Planet Formation" by Satoshi Yamamoto
4. Chemical Evolution of the Universe" by Bernard E. J. Pagel
5. Astrochemistry and Astrobiology" by Ian W. M. Smith:

References:

1. "Chemistry of Space" by Paul L. Richards
2. "Space Propulsion Analysis and Design" by Ronald Humble and Gary Henry
3. "Planetary Sciences" by Imke de Pater and Jack J. Lissauer
4. "Introduction to Environmental Chemistry" by Julian E. Andrews

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3				3										
CO2		2			3										
CO3			2			2	2				2	2			

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CO4				3											

ARTIFICIAL INTELLIGENCE FOR SUSTAINABLE CHEMISTRY
IV B.Tech – VII Semester (Code: OCY2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

- Understand the principles of artificial intelligence (AI) and its relevance to sustainable chemistry.
- Apply AI techniques for drug target identification and optimization of chemical processes in sustainable drug development.
- Develop AI models for predictive analysis in the context of drug properties and behaviors, incorporating sustainability considerations.
- Explore and evaluate the ethical and social implications of AI applications in sustainable drug discovery and design.

Course outcomes:

CO1:Define the fundamental concepts of artificial intelligence and recognize its significance in sustainable chemistry.

CO2:Apply AI techniques for drug target identification and understand their role in the drug discovery process.

CO3: Develop skills in implementing AI algorithms for predictive analysis and optimization in the context of drug development.

CO4:Evaluate the ethical and social implications of using AI in drug discovery, considering factors such as bias, transparency, and patient privacy.

UNIT I

Introduction to Artificial Intelligence in Sustainable Chemistry:

Definition and Significance of AI; Basics of AI, machine learning, and deep learning, Relevance of AI in sustainable chemistry and drug discovery

UNIT II

AI in Drug Target Identification:

Overview of Drug Discovery Process, Stages of drug discovery and development, Challenges in traditional drug discovery methods

AI Techniques for Drug Target Identification: Machine learning approaches for target identification, Case studies illustrating successful target identification with AI

UNIT III

AI in Compound Screening and Design AI in High-throughput Compound Screening:

AI applications in high-throughput screening, Examples of successful compound screening with AI

AI-Driven Rational Drug Design: Integrating AI in rational drug design strategies, Designing novel drug candidates with sustainability considerations

UNIT IV

Predictive Modeling in Sustainable Drug Development:

AI Models for Predictive Analysis: Predictive modeling of drug properties using AI, Applications in sustainable drug development

Ethical and Social Implications in Sustainable Drug Development: Evaluating the ethical considerations of AI in drug development, Discussing the social impact of AI-driven solutions in sustainable drug development

Text Books

1. Machine Learning: A Probabilistic Perspective" by Kevin P. Murphy
2. Artificial Intelligence: Foundations of Computational Agents" by David L. Poole and Alan K. Mackworth
3. Data Science for Chemists: A Primer" by Ajit J. Thakkar
4. Chemoinformatics and Computational Chemical Biology" by Jürgen Bajorath
5. Sustainable Chemistry" by Peter H. Seeberger and Kevin M. Williamson
6. Machine Learning in Chemistry" by David C. Young

References:

2. "Artificial Intelligence: A Modern Approach" by Stuart Russell and Peter Norvig
3. "Sustainable Chemistry" by Paul T. Anastas and John C. Warner
4. "Machine Learning Yearning" by Andrew Ng
5. "Chemistry and Sustainability in the Information Age" by Eric Lichtfouse

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2				2					2					
CO2		3			2				2	2					
CO3			3			2		2	2	2	2	2			
CO4				2				3							

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MATERIAL CHEMISTRY IN DAILY LIFE

IV B.Tech – VII Semester (Code: OCY3)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

- To create awareness of various food products and their contaminates
- To give students knowledge and skill that allow an overall assessment of the fate of foreign chemicals in the environment and of their effects on different biological organization levels.
- To understand the chemistry & applications of Carbohydrates, Vitamins, *drugs* oils, and detergents with respect to their unique qualities
- To introduce students to various classes of biomaterials & understanding their characteristics and applications.

Course outcome:

After completion of the course student will be able to:

CO1: Come out with knowledge of the basics of Food Quality, Quality Control, Quality Assurance and Food Safety.

CO2: Present and explain mechanisms for adverse effects of chemicals on biological system & soil followed by their remedies.

CO3: Know the effectiveness of Vitamins, Drugs, detergents and uses of oils, fats, carbohydrates etc and makes the students to bring awareness regarding all these materials.

CO4: Explore the vast applications of biomaterials in detail and to design engineering, synthetic and natural materials for biomedical applications.

UNIT-I

Dairy Products: Composition of milk and milk products. Analysis of fat content, minerals in milk and butter. Estimation of added water in milk.

Beverages: Analysis of caffeine in coffee and tea, detection of chicory in coffee, chloral hydrate in toddy, estimation of methyl alcohol in alcoholic beverages.

Food additives, adulterants and contaminants- Food preservatives like benzoates, propionates, sorbates, disulphites. Food adulteration and contamination effects on human health.

Artificial sweeteners: Aspartame, saccharin, dulcin, sucralose and sodium cyclamate.

Flavours: Vanillin, alkyl esters (fruit flavours) and monosodium glutamate.

UNIT II

Air Pollution: Air pollutants, prevention and control, Greenhouse gases and acid rain. Ozone hole and CFC's. Photochemical smog and PAN. Catalytic converters for mobile sources. Bhopal gas tragedy.

Toxic chemicals in the environment. Pesticides and insecticides-pollution aspects, Solid pollutants- treatment and disposal. Treatment of industrial liquid wastes.

Composition of soil – inorganic and organic components in soil-micro and macronutrients.

Feritlisers: Classification of Fertilizers- Straight Fertilizers, Compound/Complex Fertilizers, Fertilizer Mixtures. Manufacture and general prosperities of Fertilizer products- Urea and DAP.

UNIT-III

Vitamins: Classification, Sources, deficiency diseases and structures of Vitamin A1, Vitamin B1, Vitamin C, Vitamin D, Vitamin E & Vitamin K1.

Drugs: Classification, Structure, dosage and uses of: *Analgesics* – aspirin, paracetamol; *Anthelmentic drug*: mebendazole; *Antiallergic drug:* Chloropheneramine maleate; *Antibiotics:* Pencillin V, Chloromycetin, Streptomycin. *Anti-infalmmatory agent:* Oxypheno-butazone; *Antimalarials:* Primazuine phosphate & Chloroquine.

Oils and fats: Composition of edible oils, detection of purity, rancidity of fats and oil. Tests for adulterants like aregemone oil and mineral oils.

Soaps & Detergents: Structures and methods of use of soaps and detergents. Detergents-pollution aspects, eutrophication

UNIT IV

Biomaterials: Introduction to classes of materials used in medical applications:

Metals and ceramics: stainless steels, cobalt based alloys, titanium based alloys, characteristics and processing of bioceramics, nearly inert crystalline ceramics, porous ceramics, bioactive glasses and glass ceramics.

Dental materials: Introduction to dental materials polymers, ceramics and metals, applications of dental materials, physico-chemical, mechanical, toxicological effects of dental materials and implants.

Nanobiomaterials: Interaction of bio-molecules and nano particle surfaces. Biocompatible nanomaterials, Nanogels and microgels: preparation methods, characterization and applications.

Text Books:

1. Organic Chemistry by I. L. Finar, Vol. 1 & 2.
2. Analysis of Foods – H.E. Cox: 13. Chemical Analysis of Foods – H.E.Cox and pearson.
3. Handbook on Feritilizer Technology by Swaminathan and Goswamy, 6th ed. 2001, FAI.
4. S. Ramakrishna, T. S. Sampath Kumar, *Biomaterials: A nano approach.*CRC press, 2010
5. A. Kirkland and J. Hutchison, *Nano characterization,* RSC publishers, 2007.
6. Foods: Facts and Principles. N. Shakuntala Many and S. Swamy, 4th ed. New Age International (1998)

References

1. Medicinal Chemistry by Ashtoush Kar.
2. Drugs and Pharamaceutical Sciences Series, Marcel Dekker, Vol. II, INC, New York.
3. B. Ratner, A. Hoffman, F. Schoen, J Lemons, *Biomaterials Science: An introduction to materials in Medicine. 2nd edition,* Academic Press, 2004.
4. S. Dumitriu, 2nd edition, *Polymeric Biomaterials.* Marcel Dekker, 2002

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1				3		3			3			3			
CO2		3	3	3		3						3			
CO3	2		3	3		3						2			
CO4	2	2	3			3					2				

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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PROFESSIONAL COMMUNICATION
IV B.Tech – VII Semester (Code: OEL1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives

The course will enable students to

- Improve grammar, mechanics and writing style for clarity, concision, coherence andemphasis and increase knowledge of technical communication
- Identify and understand the facets and functions of the primary genres of technicalwriting, reports, proposals and project reports
- Define and identify different life skills required in professional life
- Explain the basic mechanics of effective communication and demonstrate these throughpresentations.

Course Outcomes

The students will be able to

CO1:Utilize writing skills in writing Technical reports, Project Proposals and make oralpresentations of their findings

CO2:Develop strategies for addressing multiple audiences, expert and lay audiences.

CO3:Apply principles of cross cultural etiquette and build professional network

CO4:Demonstrate improved competency of Soft Skills required for the workplace

UNIT-I

Preparing project reports

Research methods- Abstract writing- background knowledge of the research topic-Literature review—Plagiarism- methodology- sampling- data collection and analysis- Integrate tables, figures, and other images into documents -presenting the findings- conclusion- preparing references- Appendices

UNIT II

Oral presentation of the Projects (Viva voce)

Presentation and oral communication skills- presenting the findings of research- Maintaining audience orientation- body language- voice modulation- delivery of ideas

UNIT III

Life skills for professionals

Understanding career management- Networking professionally- Mastering Cross Cultural Etiquette - Respecting social protocols- Developing a long term career plan- Making career choices

UNIT IV

Corporate Etiquette

Power Dressing – Greeting – Introduction - Polishing Business Manners (Hand Shakes, Gifts, Humor, Office Behavior) – The art of Small talk & Conversations - Dining Etiquette

Reference Books

- Training in Interpersonal Skills: Tips for Managing People at Work, Pearson Education, India; 6edition, 2015.
- The Ace of Soft Skills: Attitude, Communication and Etiquette for Success, Pearson Education; 1edition, 2013.
- Butterfield Jeff, "Soft Skills for Everyone", Cengage Learning India Pvt Ltd; 1 edition, 2011.
- Markel, Mike, Technical Communication (9th Edition) Boston: Bedford/St. Martin's,2009.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	-	-	-	-	-	-	2	2	3	3	3	2	-	2	-
CO2	-	-	-	-	-	-	2	2	3	3	3	2	-	2	-
CO3	-	-	-	-	-	-	0	2	3	3	3	2	-	2	-
CO4	-	-	-	-	-	-	2	2	3	3	3	2	-	2	-

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GRAPH THEORY
IV B.Tech – VII Semester` (Code: OMA1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

Students will learn how to

- To apply the fundamental concepts of graph theory for determining Isomorphism of graphs and also solving the real life problems like Konigsberg Bridge Problem and travelling Salesman Problem
- To analyze the concepts of Trees and Fundamental Circuits with their properties for finding Minimal Spanning Trees in weighted Graphs by using Kruskals and Prim's Algorithms.
- To acquire the ample knowledge of coloring of a graph and Planar graphs with their different representations for detecting the planarity of graphs by using Kurotowski's Theorem and also Computing the Chromatics number for a given graph including four color problem.
- To get an idea of representation of graphs in matrices such as incidence matrix, Adjacency matrix etc and establishment of the correspondence between graph-theoretic properties and matrix properties.

Course outcomes:

After studying this course, the students will be able to

CO1: Discuss the basic concepts of graph theory and able to determine whether a graph is Eulerian and Hamiltonian..

CO2: Apply Kruskal's and Prim's algorithms in order to determine the minimum spanning tree in a connected weighted graph.

CO3: Determine the planarity of a graph using Kuratowski's algorithm and find the chromatic number of a given graph..

CO4: Analyse the properties of graphs through matrix representation and utilize these ideas in the application of switching network.

UNIT- I

PATHS AND CIRCUITS:

Introduction: Graphs: Graph, Finite and infinite graphs, Incidence and degree, isolated vertex, pendent vertex and null graph; Isomorphism; Subgraphs; walks, paths and circuits; Connected graphs, Disconnected graphs and Components; Euler graphs(Konigsberg Bridge Problem); Hamiltonian Paths and circuits; Travelling salesman problem.

[Sections: 1.1; 1.3; 1.4; 1.5; 2.1; 2.2; 2.4; 2.5; 2.6; 2.9; 2.10]

UNIT – II

TREES AND FUNDAMENTAL CIRCUITS: Trees; Some Properties of Trees; Distance and centers in a Tree; Rooted and Binary Trees; Spanning Trees; Fundamental circuits; Spanning Trees in a Weighted graphs(Kruskal's Algorithm and Prim's Algorithm).
[Sections:3.1; 3.2; 3.4; 3.5; 3.7; 3.8; 3.10

UNIT – III

PLANAR AND DUAL GRAPHS: Planar graphs; Kuratowski's two graphs; Different Representations of a Planar graph: Euler's formula, Theorem-5.6 and Corollary; Detection of planarity(Kuratowski's theorem); Geometric Dual; Coloring of a Graph, Chromatic number, The four Color problem.

[Sections: 5.2; 5.3; 5.4; 5.5; 5.6; 8.1, 8.6]

UNIT - IV

MATRIX REPRESENTATION OF GRAPHS: Incidence Matrix; Submatrices of A(G); Circuit Matrix; Fundamental Circuit Matrix and Rank of B; Application to a switching network; Cut-set Matrix; Relationship among A_f, B_f and C_f; Path Matrix; Adjacency Matrix.
[Sections:7.1; 7.2; 7.3; 7.4; 7.5; 7.6; 7.7; 7.8; 7.9]

TEXT BOOKS:

1. Narsingh Deo, 'Graph Theory with Applications to Engineering and Computer Science' Prentice-Hall of India Private Limited, New Delhi.

REFERENCE BOOKS:

1.Douglas B. West "Introduction to graph Theory" Pearson Education Private limited, Delhi, 2002.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3	3	2	-	-	-	-	-	-	-		2			
CO2	2	3	2	-	-	-	-	-	-	-	-	2			
CO3	2	3	2	-	-	-	-	-	-	-	-	2			
CO4	3	3	2	-	-	-	-	-	-	-	-	2			

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ABSTRACT LINEAR ALGEBRA
IV B.Tech – VII Semester` (Code: OMA2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

Students will learn how to

- Verify a vector Space, check for basis and find the rank.
- To find the eigen values and eigen vectors, diagonalization of a square matrix and finding higher power of a given square matrix.
- Define an inner product inner product, orthogonal projections, Gram-Schmidt orthgonalization process, least square solution of a system.
- To learn diagonalization of symmetric matrices and singular value decomposition of a matrix.

Course outcomes:

After studying this course, the students will be able to

CO1: Appy the definition for verification of a vector space, Change of basis and finding dimension of a vector space

CO2: Find matrix representation of a transformation, eigven values, eigen vectors and diagonalization of a matrix and its power matrix

CO3: Use the knowledge for orthonormal basis. Method of least square to fit a polynomial for the given data

CO4: To diagonalize a symmetric matrix and singular value decomposition of a matrix

UNIT- I

Vector Spaces:

Vector Space and Subspaces, Null Spaces, Column Spaces and Linear Transformations, Linear Independent Sets, Bases, The dimension of a vector space, Rank.

[Sections 4.1, 4.2, 4.3 4.5, and 4.6]

UNIT – II

Eigen Values and Eigen Vectors:

Eigen Vectors and Eigen values, The Characteristic Equation, Diagonalization, Eigen Vectors anLinear Transformations.

[Sections 5.1, 5.2, 5.3, and 5.4]

UNIT – III

Orthogonality and Least Squares:

Inner Product, Length, and Orthogonality, Orthogonal Sets, Orthogonal Projections, The Gram–Schmidt Process, Least-Squares Problems.

[Sections 6.1, 6.2, 6.3, 6.4 and 6.5]

UNIT - IV

Symmetric Matrices and Quadratic Forms:

Diagonalization of Symmetric Matrices, Quadratic Forms, Constrained Optimization, The Singular Value Decomposition.

[Sections 7.1, 7.2, 7.3 and 7.4]

TEXT BOOKS:

1.Linear Algebra and Its Applications by David C. Lay, Steven R. Lay and Judi J. McDonald 5th edition, Pearson, 2016

REFERENCE BOOKS:

1. Linear Algebra and Its Application" by Gilbert Strang, 4th edition, Cengage India Limited,2014

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	3	2									2			
CO2	3	2	2									3			
CO3	3	3	2									2			
CO4	2	2	2									3			

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NANO MATERIALS AND TECHNOLOGY

IV B.Tech – VII Semester` (Code: OPH1)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

Students will

- Understand the concepts of nanoscience and synthesis of nano materials
- Learn the nano scale paradigm in terms of various properties
- Gain the knowledge of specific characterization technics of nanomaterials and nanotubes
- Get scientific understanding of applications of nanomaterials in agriculture, medicine , Biology, defense etc.

Course outcomes:

After studying this course, the students will be able to

CO1: Scale up synthesis of nanomaterials and understand quantum confinement

CO2: Understand properties of nanomaterials and nano tubes

CO3: Know the characterisation techniques of nano materials

CO4: Know the usage of nano particles in nano biology and nano medicine.

UNIT- I

I NTRODUCTION TO NANO TECHNOLOGY: history of Nano materials nano scale, conventional and Nano materials differences, quantum confinement, quantum wells, quantum wires, quantum dots, surface to volume ratio, nano ceramics, nano composites and nano clusters .

SYNTHESIS OF NANOMATERIAL: Bottom up and top down approaches, cryo rolling, high energy ball milling, chemical vapour deposition, solgel method, laser ablation, rapid solidification processing, equal channel angular extrusion, molecular beam epitaxy, sputtering ,hydrothermal method, physical vapour deposition and electro deposition.

UNIT – II

PROPERTIESOFNANOMATERIALS: Electrical, magnetic, optical, physical, chemical, mechanical, thermal and electro-chemical properties.

CARBON NANOMATERIALS: Nanotubes, graphene, bucky balls, nano horns, properties of carbon nanotubes, synthesis of carbon nano materials, application of carbon nano tubes.

UNIT – III

CHARACTERIZATION OF NANO MATERIALS:X-ray diffraction, scanning electron microscopy, uv-visible spectroscopy, scanning tunnelling microscopy, differential thermal analysis and differential scanning calorimetry , FTIR.

UNIT - IV

APPLICATION OF NANOMATERIALS: Electronics, computers, biomedical, mechanical, chemical, coatings, optoelectronic, environmental, sensors ,aerospace, textiles, cosmetics and medical applications.

TEXT BOOKS:

1. Kulkarni Sulabha K,Nanotechnology: Principles and Practices, capital publishing company ,2007.

2. Stuart M.Lindsay, Introduction to nano science ,Oxford University Press,2009.

3. Robert Kelsall ,Iam Hamley, Mark Geoghegan, Nanoscale,Scince and Technology,John Wiley&Sons,2005.

REFERENCE BOOKS:

1.Robert Kelsall ,Iam Hamley, Mark Geoghegan, Nanoscale,Scince and Technology,John Wiley&Sons,2005.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1	3	2													
CO2	3	2													
CO3	2		2	2											
CO4	2				2										

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OPTOELECTRONICDEVICES AND APPLICATIONS
IV B.Tech – VII Semester` (Code: OPH2)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course objectives:

Students will learn

- Understand the concepts of different lasers and mode locking systems.
- Gain the knowledge about light generating devices, solar cells and display devices
- To know the operating mechanism and applications of various light detecting devices
- To familiarize electro optic modulators relating to communication

Course outcomes:

After studying this course, the students will be able to

CO1: Develop the knowledge of laser operating principles and structures to produce giant optical pulses.

CO2: To Acquire the detailed knowledge about functionality and applications of solar cells ,light generating and display devices

CO3: To possess the skills of design ,develop and adoption of photo detectors in real time electronic applications.

CO4: To have the knowledge on the usage of optical modulators in communication process.

UNIT- I

Optical process in semiconductors /optical media: Interaction of photons with matter , radiative non radiative processes , rates of absorption and emission –laser principle optical feedback-threshold condition-semiconductor laser –heterojunction lasers quantum well lasers, tunneling based lasers, mode locking: active mode locking and passive mode locking Q-switching

UNIT – II

Display devices: photo luminescence, cathode luminescence ,electro luminescence, injection luminescence,LED principle of operation- LED structure –frequency response –defects and reliability, plasma display liquid crystal display ,numerical display-photovoltaic effect- I-V characteristics and spectral response of solar cells –heterojunction and cascaded solar cells-Schottky barrier and thin film solar cells –design of solar cell.

UNIT – III

Detection devices: photodetection principle ,photo detector –thermal detector – photo conductor –noise in photo conductors –PIN photo diode –APD detector performance parameters –detectors for long wave length operation –wave length selective detection charge coupled device (CCD), application of infrared detector used for TV and remote controllers

UNIT - IV

Communication –types of communication –examples –modulation-types of modulation – limitations of direct modulation – modulation by carrier injection in semiconductors – electro optic modulators – Kerr modulators Acousto- optic modulators (Bragg cell) , interferometric modulators semiconductor optical amplifiers

TEXT BOOKS:

1. 1. Pallab Bhattacharya “Semiconductor opto electronic devices” , Prentice Hall of India Pvt. LTD, New Delhi 2009
2. Jasptit Singh, “Opto Electronics-An introduction to Materials and Devices” ,Mc Graw-Hill International Edition,2014.
3. S.C.Gupta,”Opto Electronic Devices and Systems”, Prentice Hall of India,2015
4. J.Wilson and J.F.B.Hawes,”Optoelectronics-An Introduction”,Pearson Educatiob, Taiwan Ltd,2010.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO’s												PSO’s		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	3														
CO2	2														
CO3	2		2												
CO4	2			2	2										

BAPATLA ENGINEERING COLLEGE:: BAPATLA
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FIBER OPTIC COMMUNICATIONS
IV B.Tech – VII Semester` (Code: OPH3)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

COURSE OBJECTIVES:

Students will

- Get the concepts of optical fibers and losses and distortion of optical signals.
- Understand the optical sources to fiber couplings and fiber to fiber joints
- Gain the knowledge of optical communication link analysis
- learn the attenuation measurement and fault finding technics

COURSE OUTCOMES:

After studying this course, the students will be able to

CO1: Identify signal degradation and losses in optical fibers.
CO2: Understand power launching and coupling in optical fibers
CO3: Compute optical fiber link design parameters.
CO4: Measure optical parameters and optical signal losses.

UNIT- I

Fiber optical wave guides :Introduction ,total internal reflection ,types of fibers,planar dielectric wave guide, optical fiber wave guides-inter-modal dispersion ,single mode fibers,low dispersion fibers.

Signal degradation in optical fibers :Attenuation, Absorption, Scattering losses, Radioactive losses signal distortion in optical wave guides ,information capacity determination, intra model dispersion(material dispersion, wave guide dispersion**)**

UNIT – II

Power launching and coupling: Source to fiber power launching, source output pattern power-coupling calculation ,power launched verss wave length, equilibrium numerical. Aperture lensing schemes for coupling improvement nanimaging micro sphere. Laser diode-to-fiber-coupling,fiber-to-fiber joints, mechanical misalignment ,fiber-related losses, fiber end face preparation, fiber splicing optical fiber connectors**.**

UNIT – III

Transmission link analysis :point –to-point links, system consideration, link power budget, rise time budget ,transmission distance for single model links ,wave length division multiplexing (WDM) passive components ,the 2x2 fiber coupler ,the 2x2 wave guide coupler ,star coupler ,local area network .

UNIT - IV

Measurement attenuation Measurement ,the cut back technique,insertion loss method optical time domain reflectometer.dipersion measurement – inter modal diaspersion,time domainter modal diaspersion measurement ,Frequency domain inter modal diaspersion measurement,OTDR fiber application ,OTDR Trace ,attenuation measurments fiberfault location.

TEXT BOOKS:

1.Willam J&Hawkes F.B opto electronics :An introduction.(PHI)

2.Gerd Keiser optical fiber communication (3 rd edition Mc GrawHill)

References :

1.A .Selvarajan ,S .Kar,and T.SRINIVAS , fiber optic communications ,Tata Mc GrawHill,2002.

2.D.C Agarwal "fiber optics in communications "Wheeler publishing,1993.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
CO1	2	2													
CO2	2	2													
CO3	2		2												
CO4	2			2	2										

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NATIONAL CADET CORPS

IV B.Tech – VII Semester` (Code: ONCC)

Lectures	.3	Tutorial	0	Practical	0	Credits	3
Continuous Internal Evaluation			30	Semester End Examination (3 Hours)			70

Course Objectives:

- Know about the history of NCC, its organization, and Incentives of NCC for their career prospects.
- Acquire knowledge of duties and conduct of NCC cadets, understand about different NCC camps and their conducts, understand the concept of National Integration and its importance, understand the concept of self-awareness and Emotional Intelligence
- Develop the sense of time management, develop the sense of stress management in changing environment
- Understand the concept of team and its functioning, Understand the concept and importance of Social service

Course Outcomes:

After the completion of the course the students will be able to

CO 1: Imbibe the conduct of NCC cadets and respect the diversity of different Indian cultures

CO 2: Practice togetherness in all walks of their life, also do their own SWOT analysis and will work out to overcome their weakness for better performance in all aspects of life.

CO 3: Consider time as valuable resource and will use the time management strategies for optimum utilization of time and Use different strategies for stress management

CO 4: Make a team and will work together for achieving the common goals and do the social services on different occasions.

UNIT- I

NCC: Aim, Objective of NCC, Organization of NCC and NCC song, Incentives.
National Integration: Nationstate, National Interest and objectives Indian History and Culture Religions, traditions and customs of India National Integration and Its Importance Unity In Diversity, Contribution of Youth In Nation Building

UNIT- II

Drill: Foot Drill, General and word of command, Attention, standatease and standeasy, turning and inclining at the halt, Sizing, forming up Inthrees and numbering, open and close order march and dressing, Saluting at the halt getting on parade dismissing and falling out, Marching, length of pace and time of marching in quick time and halt, slow march and halt. Sidepace, pace forward and to the rear Tuming on the march and wheeling Saluting on the march Marking time, Forward march and halting quick time, Changing step, Formation of

squad and squad drill Drill with Arms Attention, standatease and standeasy, Getting on parade with rifle and dressing at the order Dismissing and falling out, Ground/take uparms, Present from the order and wiseversa GenSalute, Salami Shastra Squad drill Short/long trail order and vice-versa, Instructional Practice.

UNIT- III

Weapon Training: Characteristics of a rifle/rifle ammunition and Hsflrepower Stripping. Assembling, care and cleaning and sight setting Load, cocking and unloading The lying position and holding Trigger control and firing a shot Range procedure and safety precautions Aiming IIalteration of sight Theory of group and snap shooting Short range firing. **Characteristics of 0.22rifle 7.62 mm SLR 14**

Leadership: Values/code of ethics, Perception, Communication including interpersonal communication Motivation, Discipline and duties of a good citizen Leadership traits, Types of Leadership Character / personality development, Effects of leadership with historical examples Customs of services, Importance of Group/Teamwork

UNIT- IV

Disaster Management: Civil defense organization and its duties, Types of emergencies /Natural disasters, Firefighting Traffic control during disaster under police supervision Essential services and their maintenance Disaster management during Flood/ Cyclone Disaster management during earthquake Setting up of relief camp during Disaster management Assistance in removal of Debris Collection and distribution of Aid material.

Social Service: Weaker section of our society and their needs , Basics of social service and Its need Drug trafficking and crime, Contribution of youth towards social welfare Family planning,

Health and Hygiene: Structure and functioning of the human body Hygiene and sanitation, Prevent able diseases Physical and mental health, First aid in common medical emergencies Fractures, types and treatment, Dressing of wounds, Yoga Introduction and exercise, Evacuation of casualties

Self Defense: Vulnerable parts of the body Prevention of unto ward Incidents Physical self defense

REFERENCE BOOKS:

1) Implies training conducted for NCC cadets as per Training Manuals and Cadet Hand Book issued by DG NCC, Ministry of Defence.

Mapping of Course Outcomes with Program Outcomes & Program Specific Outcomes															
	PO's												PSO's		
CO	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
CO1							2	3	3	3		3			
CO2							2	3	3	3		3			
CO3							2	3	3	3		3			
CO4							2	3	3	3		3			