

**VASAVI COLLEGE OF
ENGINEERING(AUTONOMOUS)**

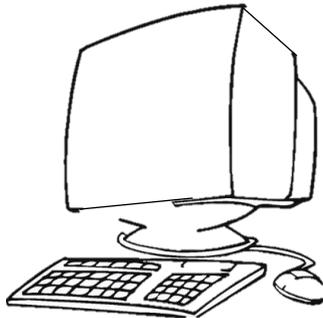
Ibrahimbagh, Hyderabad-31

Approved by A.I.C.T.E., New Delhi and
Affiliated to Osmania University, Hyderabad-07

**Sponsored by
VASAVI ACADEMY OF EDUCATION
Hyderabad**



**SYLLABI UNDER CBCS FOR
B.E V and VI SEMESTERS (CSE)
WITH EFFECT FROM 2018-19
(For the students admitted in 2016-17)**



DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

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Department of Computer Science and Engineering

VISION OF THE DEPARTMENT

To be a center for academic excellence in the field of Computer Science and Engineering education to enable graduates to be ethical and competent professionals.

MISSION OF THE DEPARTMENT

To enable students to develop logic and problem solving approach that will help build their careers in the innovative field of computing and provide creative solutions for the benefit of society.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION FOR BE V-SEMESTER w.e.f. 2018-19 under CBCS
(Students admitted in 2016-17)

S. No	Course Code	Course Name	Scheme of Instruction				Scheme of Examination			Credits
			Periods per Week				Duration in Hrs	Max Marks		
			L	T	D	P		SEM Exam	CIE	
THEORY										
1	PC510CS	Database Management Systems	3	0	0	0	3	70	30	3
2	PC520CS	Micro Processors and Interfacing	3	0	0	0	3	70	30	3
3	PC530CS	Computer Networks	3	1	0	0	3	70	30	3
4	PC540CS	Automata, Languages and Computation	3	0	0	0	3	70	30	3
5	HS 500EH	Economics and Finance for Engineers	2	1	0	0	3	70	30	2
6	MC500EH	Human Values and Professional Ethics– II	1	0	0	0	2	50	30	1
7	HS510EH	Finishing School-III: Soft Skills	1	1	0	0	1.5	35	15	1
8	MC510CS	Finishing School-III: Technical Skills	1	1	0	0	1.5	35	15	1
9	OE5XXXX	Open Elective-IV	1	0	0	0	2	50	30	1
10	OE5XXXX	Open Elective-V	2	0	0	0	3	70	30	2

S. No	Course Code	Course Name	Scheme of Instruction				Scheme of Examination			Credits
			Periods per Week				Duration in Hrs	Max Marks		
			L	T	D	P		SEM Exam	CIE	
PRACTICALS										
1	PC511CS	Database Management Systems Lab	0	0	0	2	3	50	25	1
2	PC521CS	Micro Processors and Interfacing Lab	0	0	0	2	3	50	25	1
3	PC531CS	Computer Networks Lab	0	0	0	2	3	50	25	1
4	PW519CS	Mini Project	0	0	0	2	-	-	25	1
		Total	20	4	0	8	-	740	370	24
		Grand Total	32					1110		

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR BE V SEMESTER
DATABASE MANAGEMENT SYSTEMS

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : PC510CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">Identify different issues involved in the design and implementation of a database system.Understand transaction processing, concurrency control and recovery techniques.	<ol style="list-style-type: none">Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram.Transform a conceptual data model into a relational model.Design database using various normalization techniques.Apply indexing and hashing techniques for effective data retrieval.Analyze strategies for managing security, backup, and recovery of data.

UNIT-I

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Design, Specialty Databases, Data Storage and Querying, Data Mining and Information retrieval, Database Architecture , Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, The E-R Model, Constraints, E-R Diagrams, E-R Design Issues, Extended E-R features, Reduction to Relational Schemas, Other aspects of Database Design.

UNIT-II

Relational Model: Structure of Relation Database, Fundamental Relational Algebra Operations, Additional Relational Algebra Operations, Extended Relational Algebra Operations, Modification of the Database.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Additional Basic Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Join Expression.

UNIT-III

Advanced SQL: SQL Data Types, Integrity constraints Authorization, Functions and Procedural Constructs, Recursive Queries, Triggers, JDBC, ODBC and Embedded SQL.

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies, functional Dependency Theory, Algorithm for Decomposition, Decomposition using Multivalued Dependencies.

UNIT-IV

Indexing and Hashing : Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing, Comparison of Ordered Indexing and Hashing , Bitmap Indices.

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability, Transaction Isolation Levels, Implementation of Isolation Levels.

UNIT-V

Concurrency Control: Lock Based Protocols, Timestamp – Based Protocols Validation Based Protocols, Multiples Granularity, Multiversion Schemes, Deadlock Handling, Insert and Delete Operations, Weak Levels of Consistency, Concurrency in Index Structures.

Recovery System : Failure Classification, Storage Structure Recovery and Atomicity, Log Based Recovery, Recovery with Concurrent Transactions, buffer Management, Failure with Loss of Non-volatile Storage, Advanced Recovery Techniques, Remote Backup Systems.

Suggested Books:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International.

Reference Books:

1. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
2. *Raghu Ramakrishna, and Johannes Gehrke*, Database Management Systems, 3rd Edition(2003), McGraw Hill.
3. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
4. Peter Rob, Carlos coronel, Database Systems, (2007), Thomson.

Online Resources:

1. <http://nptel.ac.in/courses/106106093/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
MICROPROCESSORS AND INTERFACING

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : PC520CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">To familiarize the students with the concept of 8086 microprocessor and 8051 microcontroller in the aspects of architectural, programming and interfacing with the real world.	<ol style="list-style-type: none">Describe the architecture of 8086 microprocessor. Analyze addressing modes and instruction set of 8086.Compare and contrast macros with subroutines.Interface analog and digital I/O devices with 8086.Write assembly language programs using instruction set of 8051.Interface 8051 microcontroller with I/O devices like keyboard and Stepper Motor.

UNIT-I

Microprocessor – Introduction, Overview of Micro computer structure and Operation, Microprocessor Evolution and Types, 8086 Internal Architecture, Pin Configuration, Minimum and Maximum mode, Segment flags, Addressing modes, Instruction set, Programming the 8086, Accessing Data in Memory.

UNIT-II

Implementing standard program structures in 8086, Strings, Procedures and Macros, Assembler directives, Interrupts and Interrupt Applications, Hardware and software interrupt applications, Interrupt examples.

UNIT-III

Digital Interfacing - Programmable Parallel Ports and Handshake Input / Output, Keyboard and display Controller (8279) Interfacing, Interfacing to Alpha Numeric Displays, Interfacing LCD displays.

Analog Interfacing – A/D & D/A interfacing, DMA Controller (8257), Interfacing and Refreshing Dynamic RAMs.

UNIT-IV

Introduction to Microcontrollers, 8051 Architecture, Instruction set, Addressing modes and Programming techniques. Comparison of various families of 8-bit micro controllers, System Design Techniques.

UNIT-V

Interfacing of LCD, ADC, Sensors, Stepper motor, keyboard and DAC using 8051 microcontrollers. Communication standards – serial RS232 and USB. Features of Advanced processors.

Suggested Books

1. Douglas V. Hall, Microprocessors and Interfacing, 2ndEdition (2006), McGraw Hill.
2. Kenneth J. Ayala, The 8051 Microcontroller Architecture, Programming and Application, Penram International (2007)

Reference Books

1. Yu-cheng Liu, Glenn A. Gibson, Microcomputer Systems The 8086/8088 Family - Architecture, Programming and Design 2ndEdition (2011)
2. Barry B. Brey, The Intel Microprocessor, 8086/8088, 80186/80188, 80286, 80386, 80486, Pentium and Pentium pro-processors – Architecture, Programming and interfacing, 8thEdition (2013), Prentice Hall.
3. Ray A.K & Bhurchandhi K.M, Advanced Microprocessor and Peripherals, 2ndEdition (2007), TMH.

Online Resources

1. <http://nptel.ac.in/courses/108107029/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
COMPUTER NETWORKS

Instruction: 3+1 Hrs /week	SEE Marks :70	Course Code : PC530CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objective	Course Outcomes
Students should be able to:	At the end of the course, students will be able to:
<ul style="list-style-type: none">Apply networking concepts to work on networked systems using the existing protocols and evaluate the role of security for developing end user applications	<ol style="list-style-type: none">Compare OSI and TCP/IP reference models to understand computer network architecture.Explain Data Link Layer and MAC sub layer protocols.Illustrate network layer functions and protocols.Describe the functions of transport layer in managing communication.Apply application layer protocols for providing network services to end user applications.

UNIT-I

Introduction: Network Hardware, Network Software, Reference Models, Comparison of the OSI and TCP/IP Reference Models

Physical Layer: Guided transmission media, Wireless transmission media.

UNIT-II

Data Link Layer : Design Issues, Error Detection and Correction, Elementary Data Link Layer Protocols, Sliding Window Protocols

Multiple Access Protocols : ALOHA, CSMA, Collision free protocols, Ethernet- Physical Layer, Ethernet Mac Sub layer, data link layer switching & use of bridges, learning bridges, spanning tree bridges, repeaters, hubs, bridges, switches, routers and gateways.

UNIT-III

Network Layer: Network Layer Design Issues.

Routing Algorithms: Shortest path routing, flooding, distance vector routing, link state routing.

IP Addresses: IPV4, Subnetting, Supernetting, CIDR, NAT, IPV6.

Internet Control Protocols: ICMP, ARP, DHCP.

UNIT-IV

Transport Layer: The Transport Service, Elements of Transport Protocols
The Internet Transport Protocols (TCP and UDP): UDP, TCP: Introduction, The TCP service model, The TCP protocol, The TCP Segment Header, TCP connection establishment, connection release, TCP sliding window, TCP Timer management, TCP Congestion control, , Performance issues.

UNIT-V

Application Layer: Domain Name System -DNS Name Space, Domain Resource Records, Name Servers, FTP, TELNET

Network Security: Cryptography, Symmetric Key Algorithms: DES, AES, Cipher modes.

Public Key Algorithms: RSA. Digital Signatures, Management of Public Keys.

Suggested books:

1. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition Pearson, 2012.
2. Data Communications and Networking, 4th Edition, Behrouz Forouzan, Tata McGraw Hill, 2011.

References:

1. James F. Kurose and Keith W. Ross, Computer Networking: A Top-Down Approach Featuring the Internet, 5th Edition, Addison-Wesley, 2012
2. Chwan-Hwa (John) Wu, J. David Irwin, Introduction to Computer Networks and Cyber Security, CRC Press, 2013
3. Alberto Leon-Garcia and Indra Widjaja, Communication Networks: Fundamental Concepts and Key Architectures, Tata McGraw-Hill, 2004.

Online Resources:

1. <http://nptel.ac.in/courses/106105081/1>
2. <https://www.youtube.com/watch?v=WabdXYZCAOU>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
AUTOMATA, LANGUAGES AND COMPUTATION

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : PC540CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">• Understand the relationships among machines, languages and computational problems.• Design abstract models for formal languages.• Determine the decidability of computational problems.	<ol style="list-style-type: none">1. Design Finite Automata for Regular languages.2. Apply formal mathematical methods to prove properties of languages, grammars and Automata.3. Analyze the language and Design pushdown automata.4. Design Turing machines for simple problems.5. Describe and determine the Undecidability of a problem.

UNIT-I

Automata: Introduction to Finite Automata, Central Concepts of Automata Theory.

Finite Automata: An Informal Picture of Finite Automata, Deterministic Finite Automata, Non-deterministic Finite Automata, An application, Finite Automata with Epsilon Transitions.

Regular expressions and Languages: Regular Expressions, Finite Automata and Regular Expressions, Applications of Regular Expressions, Algebraic Laws for Regular Expressions.

UNIT – II

Properties of Regular Languages: Proving Languages not to be Regular, Closure properties of Regular Languages, Decision Properties of Regular Languages, Equivalence and Minimization of Automata.

Context Free Grammars and Languages: Context free grammars, Parse Trees, Applications of CFG's, Ambiguity in Grammars and Languages.

UNIT – III

Pushdown Automata: Definition, Languages of PDA, Equivalence of PDA's and CFG's, Deterministic Pushdown Automata.

Properties of Context Free Languages: Normal Forms for Context Free Grammars, Pumping Lemma, closure properties, Decision Properties of CFL's.

UNIT – IV

Introduction to Turing Machines: Problems that Computers cannot Solve, The Turing machine, Programming Techniques for Turing Machines, Extensions to the Basic Turing Machines, Restricted Turing Machines, Turing machines and Computers.

UNIT – V

Undecidability: A language that is not Recursively Enumerable, An undecidable problem that is RE, Undecidable problems about Turing Machines, Post's Correspondence Problem, Other Undecidable Problems.

Intractable Problems: The Classes P and NP, An NP-Complete Problem, A Restricted Satisfiability Problem.

Suggested Books:

1. John. E. Hopcroft, Rajeev Motwani, Jeffery D. Ullman, Introduction to Automata Theory, Languages and Computation, 3rd edition (2009), Pearson Education.

Reference Books:

1. John C.Martin, Introduction to Languages and the Theory of Computation, 3rd Edition (2003) Tata McGraw Hill.
2. Bernard M.Moret, The Theory of Computation (2002), Pearson Education.
3. Michael Sipser, Introduction to Theory of Computation, 3rd Edition (2012), Course Technology.
4. Mishra and Chandrashekar, 'Theory of computer science - Automata, Languages and Computation', 2nd Edition, PHI
5. ZviKohavi, Switching and finite Automata Theory, 3rd Edition (1976), TMH.

Online Resources:

1. <http://www.nptelvideos.in/2012/11/theory-of-computation.html>
2. <http://nptel.ac.in/courses/106106049/>
3. <http://user.it.uu.se/~pierref/courses/FLAT/>
4. <http://www.eecs.wsu.edu/~ananth/CptS317/Lectures/>
5. <http://www.ics.uci.edu/~goodrich/teach/cs162/notes/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
ECONOMICS AND FINANCE FOR ENGINEERS

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : HS500EH
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
1. The objective of the Course is to equip the prospective engineers with the concepts and tools of economics, finance, cost and taxes for business decisions.	At the end of the course, students will be able to: <ol style="list-style-type: none">1. Decide appropriate price for goods and services with the company's given cost structure for an estimated profit of the companies.2. Analyze the given financial statements of a firm to understand its past financial performance in the market.3. Compare the long term financial investment proposals to decide whether a proposal is financially viable or not through capital budgeting techniques.4. Identify the suitable sources of finance for the company by considering the functions of major banks such as SBI and RBI5. Calculate the impact of the new tax policies on the company's financial structure/ individual incomes.

Unit I: Basics of Economics:

Scarcity Definition of Economics - Macro and Micro Economics - Managerial Economics - Meaning of a Firm - Objectives of a Firm - Profit Maximization - Demand Concept - Price Elasticity of Demand - Meaning of Supply - Equilibrium Price and Quantity - Production - Cobb Doughlas Production Function - Economies of Scale.

Unit II: Cost and Price:

Cost - Meaning - Classification of Costs - Short run and Long run costs - Cost Sheet - Break even Analysis - Methods of Pricing (Problems on Cost Sheet, Breakeven Analysis and Methods of Pricing can be asked).

Unit III: Banking & Finance:

RBI and its role - Commercial Banks - Functions - Capital Budgeting - Discounting and Non discounting Techniques - Working Capital Management - Concepts and Components of Working Capital - Operating Cycle.

UNIT IV: Understanding Financial Statements:

Financial Statements - Meaning - Types - Purpose - Ratios (Liquidity, Solvency & Profitability Ratios) (Problems can be asked on Ratios)

Unit V: Direct & Indirect Taxes:

Heads of Income - Income from Salaries - Income from House Property - Income from Business - Income from Capital Gains - Income from Other Sources - Latest Tax Rates - GST - CGST - SGST - IGST - GST network.

Learning Resources :

1. S.P.Jain and K.L Narang., "Cost Accounting", Kalyani Publishers, Twentieth Edition Revised – 2008.
2. S.P.Jain and K.L Narang., "Financial Accounting", Kalyani Publishers – 2002.
3. Mehta P.L., "Managerial Economics: Analysis, Problems and Cases", Thirteenth Edition, Sultan Chand and Sons, Nineteenth Edition - 2013.
4. M.Y.Khan and P.K. Jain., "Financial Management – Text, Problems and Cases", Mc Graw Hill Education Private Limited, New Delhi.
5. Vinod K Singhania and Kapil Singhania., "Direct Taxes Law and Practice", Taxmann Publications, Sixtieth Edition - 2018.
6. Dr,Vinod K Singhania., "Students' Guide to GST and Customs Law", Taxmann Publications, Edition - 2018.
7. Muralidharan., "Modern Banking", Prentice Hall of India.

Reference Books:

1. M. L. Seth., "Micro Economics", Lakshmi Narain Agarwal.
2. Dr. R.P. Rustagi., "Fundamentals of Financial Management" Taxmann Publications.
3. Dr. D.M. Mithani, "Money Banking International Trade & Public Finance", Himalaya Publishing House - 2014.
4. Rajesh., "Banking Theory and Practice", Tata Mc Graw Hill Publishing

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
HUMAN VALUES AND PROFESSIONAL ETHICS – II

Instruction: 1 Hrs /week	SEE Marks :35	Course Code : MC500EH
Credits : 1	CIE Marks: 15	Duration of SEE : 2 Hrs

Course objectives	Course outcomes
<ol style="list-style-type: none">1. Get a holistic perspective of value- based education.2. Grasp the meaning of basic human aspirations vis-a-vis the professional aspirations.3. Understand professionalism in harmony with self and society.4. Develop ethical human conduct and professional competence.5. Enrich their interactions with the world around, both professional and personal.	<p>At the end of the course, students will be able to:</p> <ol style="list-style-type: none">1. Gain a world view of the self, the society and the profession.2. Make informed decisions.3. Start exploring themselves in relation to others and their work – constantly evolving into better human beings and professionals4. Inculcate Human values into their profession.5. Validate their aspirations through right understanding of human relationship and see the co-relation between the human values and prevailing problems.6. Strike a balance between physical, mental, emotional and spiritual parts their being.7. Obtain a holistic vision about value-based education and professional ethics.

UNIT-I

A. DISTINCTION BETWEEN NEED AND GREED

Exercising the wisdom to distinguish need from greed.

B. IDEAL SELF-REAL SELF-

How to define the ideal-idealism at various levels- is it possible to reach idealism –Man as a pilgrim on a journey to idealism.

UNIT - II

- A. **RIGHTS AND RESPONSIBILITIES**-Educating an individual about rights and responsibilities –Safeguards-Stimulants-Social Justice-The three catalysts for deciding rights and responsibilities.
- B. **IMBIBING AND INCULCATING CIVIC SENSE AND CIVIC-VIRTUES**,
The true meaning of Integrity -Honesty, Humility, Openness, Transparency, Dedication, Reliability, Confidentiality, accountability, Collegiality, Sympathy, Trustworthiness, Co-operation, Courage.
- a. The moral dilemma of the Modern world, Respect for Self, Others and Work.
- b. Respect for women at the workplace.

UNIT - III

MANAGING FAILURE-Identifying causes for failure and learning lessons-Using failure to score success-Role of self-confidence and personal ethics in coping with failure.

<ul style="list-style-type: none">• Anger/ Depression• Fear• Agitation• Failure• Lethargy• Dishonesty	<ul style="list-style-type: none">• Cruelty• Jealousy• Desire• Cheating• Pride• Greed• Lying
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UNIT - IV

STRESS MANAGEMENT- Identifying sources and levels of stress –Tackling stress and its associated negativity-Positive aspect of coping with stress- Some techniques to manage stress.

UNIT - V

DEVELOPING EMOTIONAL INTELLIGENCE

Self-Awareness
Handling Emotions
Motivation
Empathy
Social skills

Suggested Readings:

1. B.L Bajpai, 2004, Indian Ethos and Modern Management, New Royal Book Co., Lucknow. Reprinted 2008.
2. A.N Tripathy, 2003 Human values, New Age International Publishers.
3. EG Seebauer& Robert L. Berry,2000,Fundamentals of Ethics for Scientists and Engineers, Oxford University Press.
4. Mike Martin and Ronald Schinzinger "Ethics in Engineering "McGraw Hill
5. Charles E Haris, Micheal J Rabins, " Engineering Ethics "Cengage Learning
6. Caroline whitback, Ethics in Engineering Practice and Research, Cambridge University Press
7. Georgs Reynolds, Ethics in Information Technology", Cengage Learning
8. Charles D.Fleddermann, " Engineering Ethics", Pearson Education /Prentice Hall, New Jersey,2004 (Indian Reprint)

Online Resources

1. Value Education website, [Http://www.universalhumanvalues.info](http://www.universalhumanvalues.info)
2. UPTU website, [Http://www.uptu.ac.in](http://www.uptu.ac.in)
3. story of stuff, [Http://www.storyofstuff.com](http://www.storyofstuff.com)
4. AlGore, As Inconvenient Truth, Paramount Classics ,USA
5. Charlie Chaplin, Modern Times, United Artists, USA
6. IIT Delhi, Modern Technology-The Untold story
7. Anand Gandhi, Right Here Right Now, Cyclewala production

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E.- V SEMESTER
FINISHING SCHOOL – III : SOFT SKILLS - III

Instruction: 1+1 Hrs /week	SEE Marks :35	Course Code : HS510EH
Credits : 1	CIE Marks: 15	Duration of SEE : 1.5 Hrs

Course Objectives	Course Outcomes
<ol style="list-style-type: none">1. This is a foundation course and aims at enhancing employability skills in students. Students will be introduced to higher order thinking skills and problem solving on the following areas - Arithmetic ability, Numerical ability and General reasoning. Students will be trained to work systematically with speed and accuracy while problem solving.2. The three major areas covered in this course include<ol style="list-style-type: none">1. Numerical Ability2. Arithmetic Ability3. General reasoning	<p>At the end of the course, students will be able to:</p> <ol style="list-style-type: none">1. Solve questions on the above mentioned areas using short cuts and smart methods2. Understand the fundamentals concepts of Aptitude skills3. Perform calculations with speed and accuracy

UNIT – I : QUANTITATIVE APTITUDE - NUMERICAL ABILITY

- Numerical Ability
- Introduction to higher order thinking skills
- Speed Maths
- Number systems
- LCM & HCF

UNIT – II : QUANTITATIVE APTITUDE-ARITHMETIC ABILITY FOUNDATION

- Arithmetic Ability
- Percentage
- Profit loss and discounts
- Ratio proportions Allegations and mixtures
- Averages

**UNIT – III : QUANTITATIVE APTITUDE- ARITHMETIC ABILITY
ADVANCED**

- Arithmetic Ability
- Time speed and distance
- Time and work
- Interest calculations

UNIT – IV : REASONING ABILITY – GENERAL REASONING PART 1

- General Reasoning
- Coding decoding
- Directions
- Series completions

UNIT – V : REASONING ABILITY- GENERAL REASONING PART 2

- General Reasoning
- Analogies
- Classification
- Alphabet test
- Mathematical operations

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
FINISHING SCHOOL –III TECHNICAL SKILLS
PYTHON PROGRAMMING

Instruction: 2 Hrs /week	SEE Marks :35	Course Code : MC510CS
Credits : 1	CIE Marks: 15	Duration of SEE : 1.5 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">Learn programming and solve problems using Python language	<ol style="list-style-type: none">Write Python programs using conditional statements and loops.Apply data structures like strings, lists, tuples, dictionaries to solve a problem.Design programs using files, OOPS concept, regular expressions.Develop an application to perform database transactions.

UNIT-I

Basics of Python Programming: Features of Python, Operators and expressions, Decision Control Statements, Functions and Modules, Recursive functions. **Data Structures: Strings** –concatenating, appending and multiplying strings, strings are immutable, built-in string methods and functions, iterating strings, Regular Expressions. **Lists** – Accessing, updating values in lists, nested list, cloning lists, basic list operations, list methods, Functional programming. **Tuples** – basic tuple operations, tuple assignment, tuples for returning multiple values, nested tuples, index(),count(),zip() function. **Dictionaries** –sorting items, looping over dictionary, nested dictionaries, built-in dictionary functions.

UNIT-II

Files and Exceptions: reading and writing files, pickling, handling exceptions. **OOPS Concepts-** Introduction, classes and object, class method and self argument, the __init__()method, class variables and object variables, public and private data members, Inheritance, Operator Overloading.

Python Database Connectivity: Connecting with a database, Simple querying, Simple Insertion

Case Studies: Python Packages- Introduction to Numpy, Pandas, Scipy, Pillow, Tensorflow, Matplotlib, Bar charts, Histograms, Scatter plots, GUI programming-Tkinter.

Suggested Book:

1. Reema Thareja , "Python programming using problem solving approach ", Oxford university press.
2. Allen Downey, " Think Python: How to Think Like a Computer Scientist", O'Reilly publications, 2nd Edition.
3. Albert Lukaszewski, "Mysql for python ", PACKT publishers

Reference Books:

1. Mark Lutz , "Learning Python", O'Reilly Publications.
2. Stewart Venit and Elizabeth Drake, Prelude to Programming: Concepts and Design, 6th Edition(2015), Pearson India
3. Mark J Guzdial, Introduction to Computing and programming in Python, 3rd Edition(2013), Pearson India

Online Resources:

1. <http://nptel.ac.in/courses/117106113/34>
2. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-01sc-introduction-to-electrical-engineering-and-computer-science-i-spring-2011/python-tutorial/>
3. www.scipy-lectures.org/intro/language/python_language.html
4. <http://flask.pocoo.org/docs/0.12/tutorial/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
DATABASE MANAGEMENT SYSTEMS LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code : PC511CS
Credits : 2	CIE Marks: 25	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">• Implement various modules in Database management system.• Develop programs using PL/SQL	<ol style="list-style-type: none">1. Design and Implement a database schema2. Retrieve Data using DDL, DML, DCL and TCL commands.3. Create database by applying various Normal forms.4. Implement programs using PL/SQL5. Design and implement a project using SQL and GUI.

1. SQL

1. Creation of database (Exercising the commands like DDL, DML, DCL and TCL)
2. Exercising all types of Joins.
3. Creating tables in I Normal, II Normal, III Normal and BCNF Form.
4. Creating tables using combination of constraints.
5. Exercising complex Queries.
6. Usage of Stored Functions.
7. Creating Password and Security features for an Application.
8. Usage of file locking, Table locking facilities in Applications.

2. PL/SQL

- a) Demonstration of Blocks, Cursors, Procedures, functions and Packages.
- b) Demonstrate Exception Handling.
- c) Usage of Triggers to perform operation on Single and Multiple Tables.
- d) PL/SQL Procedures for data validation.

3. FORMS

Creation of forms for colleges Information System, Library Information System and Recruitment Cell.

4. REPORTS

- a. Creation of Reports based on different queries.
- b. Creation of full-fledged Database Application.

Suggested books

1. Ivan Bayross, SQL, PL/SQL, The Programming Language of Oracle, 4th Edition, PBP Publications.

Reference Books

1. Nilesh Shah, Database Systems Using Oracle, 2nd Edition(2007), PHI.
2. Rick F Van der Lans, Introduction to SQL, 4th Edition(2007), Pearson Education.
3. Benjamin Rosenzweig Elena Silvestrova, Oracle PL/SQL by Example, 3rd Edition(2004), Person Education.
4. Albert Lulushi, Oracle Forms Developer's Handbook, 1st Edition(2006), Pearson Education.

Online resources

1. <https://www.lynda.com/Access-tutorials/Welcome/195854/373426-4.html>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
MICROPROCESSORS AND INTERFACING LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code : PC521CS
Credits : 2	CIE Marks: 25	Duration of SEE : 3 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">• Implement assembly language programs in 8086 & 8051.• Interface I/O devices to Microprocessor and Microcontroller.	<ol style="list-style-type: none">1. Implement programs using instruction set of 8086.2. Implement programs on arithmetic operations using 8086.3. Develop an application to interface I/O devices to 8086 microprocessor.4. Implement assembly language programs using 8051 microcontroller.5. Develop an application to interface I/O devices using 8051 microcontroller.

8086 PROGRAMMING USING MICROPROCESSOR TRAINER KIT

1. Execution of basic programs on 8086 Microprocessor.
2. Programs using different addressing modes.
3. Programs using single byte, multi byte, binary, BCD addition and subtraction.
4. Programs on searching and sorting.
5. Generation of waveforms and applications using 8253/ 8254 timers.
6. Generation of waveforms using DAC interface.
7. Interfacing and programming of 8255. (E.g. traffic light controller).
8. Interfacing keypad/display unit.

8051 PROGRAMMING

9. Execution of basic programs on 8051 Microcontroller.
10. Programs on searching and sorting.

11. Interfacing Stepper Motor.
12. Interfacing LCD Display.
13. Interfacing Keypad.

Suggested books:

1. Douglas V. Hall, Microprocessors and Interfacing, 2ndEdition (2006), McGraw Hill.
2. Kenneth J. Ayala, "The 8051 Microcontroller Architecture, Programming and Application", Penram International (2007)

Reference Books:

1. Yu-cheng Liu, Glenn A. Gibson, Microcomputer Systems The 8086/8088 Family - Architecture, Programming and Design 2ndEdition (2011)
2. Barry B. Brey, The Intel Microprocessor, 8086/8088,80186/80188, 80286, 80386, 80486, Pentium and Pentium pro-processors – Architecture, Programming and interfacing, 8thEdition (2013), Prentice Hall.
3. Ray A.K & Bhurchandhi K.M, Advanced Microprocessor and Peripherals, 2ndEdition (2007),TMH.

Online resources:

1. <http://nptel.ac.in/courses/108107029/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
COMPUTER NETWORKS LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code : PC531CS
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to:
<ul style="list-style-type: none">• Implement major functions of each layer with suitable algorithms.• Acquire proficiency in network programming using socket API• Implement cryptographic algorithms.• Have hands on experience on networking protocols.	<ol style="list-style-type: none">1. Implement functionalities of TCP/IP Protocol Stack layers.2. Develop client server communications using socket API.3. Implement encryption and decryption using symmetric-key and Public key algorithms.4. Design wired and wireless topologies using NS3.5. Simulate the performance of networking protocols.

Programming Exercises:

1. Understanding and using the following commands: ifconfig, netstat, ping, ARP, telnet, TFTP, FTP, nslookup and dig.
2. Implementation of Data Link Framing Methods- Bit, Byte and Character Stuffing.
3. Implementation of 16-bit CRC Error Detection Technique.
4. Implementation of Sliding Window Protocol.
5. Implementation of Dijkstra's Algorithm for computing the shortest path in a graph.
6. Implementation of Distance vector routing algorithm.
7. Implementation of Iterative and Concurrent Echo Server using Connection Oriented Protocol (TCP) and Connection Less Protocol (UDP).
8. Implementation of Leaky Bucket congestion control algorithm.
9. Implementation of Establishing a Shared key: The Diffie-Hellman key exchange.

10. Implementation of RSA algorithm for Encryption and Decryption in C.
11. Simulate a three nodes point – to – point network with duplex links between them. Set the queue size and vary the bandwidth and find the number of packets dropped.
12. Simulation of routing protocols.

Suggested Books:

1. W. Richard Stevens, Unix Network Programming – The Sockets Networking, Volume I – 3rd Edition (2003), Pearson Education, India
2. Andrew S. Tanenbaum, David J. Wetherall, Computer Networks, 5th Edition (2012), Pearson Education, India

Reference Books:

1. Cryptography & Network Security: Principles and Practices, 6th Edition (2013), Pearson India
2. James F. Kurose, Computer Networking: A Top-Down Approach, 5th Edition (2012), Pearson Education.
3. Data Communications & Networking, Behrouz. A. Forouzan, 5th Edition (2012), Tata McGraw Hill.

Online Resources:

1. <https://www.isi.edu/nsnam/ns/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
MINI PROJECT

Instruction: 2 Hrs /week	SEE Marks : -	Course Code : PW519CS
Credits : 1	CIE Marks: 25	Duration of SEE : -

Course objectives	Course outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">• Develop an application in the relevant area of Computer Science• Learn contemporary technologies	<ol style="list-style-type: none">1. Review the literature survey to identify the problem2. Design a model to address the proposed problem3. Develop and test the solution4. Demonstrate the work done in the project through presentation and documentation5. Adapt to contemporary technologies

The students are required to carry out mini projects in any areas such as Data Structures, Microprocessors & interfacing, Database Management Systems, Operating Systems, Design and Analysis of Algorithms and Software Engineering.

Students are required to submit a report on the mini project at the end of the semester.

**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E- V SEMESTER (2018-19) Engineering Branches**

Open Elective IV (Semester - V)			
Dept.	Title	Code	credits
Civil	Environmental Impact Assessment	OE510CE	1
	Remote Sensing	OE520CE	1
CSE	Introduction to Software engineering	OE510CS	1
ECE	Introduction to Telemetry	OE510EC	1
EEE	Basics of power systems	OE510EE	1
IT	Introduction to Linux	OE510IT	1
Mech.	Basics Of 3-D Printing	OE500ME	1
Open Elective V (Semester - V)			
Civil	Global Positioning Systems	OE530CE	2
	Project Management	OE540CE	2
CSE	Introduction to Java Programming	OE520CS	2
ECE	Introduction to Signal Processing	OE520EC	2
EEE	Fundamentals of Power Electronics	OE520EE	2
IT	Introduction to Java Programming Language	OE520IT	2
Mech.	Introduction to Robotics	OE510ME	2
	Basics Of Entrepreneurship	OE520ME	2

B.E- V and VI SEMESTER (2018-19) Basic Sciences and H&SS

Open Elective IV (Semester - V)			
Dept	Title	Code	credits
CHEM	Electronic Engineering Materials	OE400CH	1
	Polymer Technology	OE410CH	1
	Industrial Pollution Prevention and Control	OE420CH	1
	Electrochemical Energy Systems	OE430CH	2
	Corrosion Science and Technology	OE440CH	2
PHY	Display Devices	OE400PH	1
	Fundamentals of Vacuum Technology	OE410PH	1
	Introduction to Non-destructive Testing	OE420PH	1
	Fundamentals of Cryogenics	OE430PH	2
	Smart Materials and Applications	OE440PH	2
	Fundamentals of Thin Film Technology	OE450PH	2
ENG	Technical Writing and Professional Presentations	OE510EH	2

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE V-SEMESTER
ENVIRONMENTAL IMPACT ASSESSMENT (Open Elective – IV)

Instruction: 1 Hr /week	SEE Marks :50	Course Code :OE510CE
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The objectives of the course are to introduce</i>	<i>Upon the completion of the course, students are expected to</i>
1. The issues, impact and management plan due to Environmental of the project	1. Apprise the need, legal provisions and 2. Enumerate the methods of Environmental Impact Assessment. 3. Predict the impact and prepare the management plan for Environmental issues of the project 4. Issues related to rehabilitation of affected people, Preparation of Environmental impact statement

UNIT-I

Environmental Impact Assessment: Need for environmental impact assessment (EIA), objectives of EIA. EIA capabilities and limitations. Legal provisions of EIA. Methods of EIA, base line data collection required for EIA

UNIT-II

Evaluation of impacts: Prediction of impacts. Preparation of Environmental Management Plan, preparation of EIAs of road project, Industry, and dam. Issues related to rehabilitation of affected people, Preparation of Environmental impact statement and Environment management plan.

Learning Resources:

1. Peavy and Rowe, *Environmental Engineering*, McGraw Hill Publications.
2. Keiley, *Environmental Engineering*, McGraw Hill Publishers, 2003.
3. Sincero and Sincere, *Environmental Engineering*, Prentice Hall of India.

Online Resources

1. <http://nptel.ac.in/courses/>

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
REMOTE SENSING (Open Elective – IV)
(to other branches)

Instruction: 1 Hr /week	SEE Marks :35	Course Code : OE520CE
Credits : 1	CIE Marks: 15	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>Objectives of this course are to</i>	<i>Upon the completion of the course, students are expected to</i>
1. Provide fundamental knowledge on geo spatial technology such as remote sensing	1. Explain the basic principles of remote sensing to analyse the surface features on the Earth. 2. Describe the characteristics of satellites, platforms & sensors used in acquisition of remote sensing data required for further processing. 3. Identify and correct the remotely sensed data for atmospheric, radiometric and geometric errors to produce a high quality image. 4. Apply the principles and techniques of remote sensing to solve various problems in engineering field.

UNIT-I

Introduction: Definition, Elements of remote sensing, Physics of remote sensing, Sources of Energy, Active and Passive Radiation, Types of remote sensing, Electromagnetic spectrum and radiation, Interaction with Atmosphere, Atmospheric windows, Spectral reflectance of Earth's surface features

Data Acquisition: Satellite orbits and characteristics, various types of platforms, Sensor types & characteristics, Types of resolution-spatial, spectral, radiometric & temporal

UNIT-II

Data Pre-processing: Atmospheric errors and removal, Radiometric corrections, Geometric corrections, Geo-referencing, re-sampling methods - Basic Principles of Visual Interpretation

Applications: Applications of optical remote sensing techniques in various fields of Engineering

Learning Resources:

1. Anji Reddy M., Remote Sensing and Geographic Information System, 2012
2. John A. Richards, Remote sensing Digital Image Analysis, 2012

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DEPARTMENT OF CIVIL ENGINEERING
GLOBAL POSITIONING SYSTEM (Open Elective–V)
(to other branches)

Instruction: 2 Hr /week	SEE Marks :70	Course Code :OE530CE
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>Objectives of this course are to</i>	<i>Upon the completion of the course, students are expected to</i>
1. To provide fundamental knowledge on geo spatial technology such as GPS	<ol style="list-style-type: none">1. Describe the fundamental theory and concepts of the Global Positioning System to provide 3D positioning with great accuracy.2. Compute errors and biases in GPS measurements and apply necessary corrections to obtain accuracy as per the user specifications.3. Describe the differences between point and relative GPS positioning,4. Analyse DGPS and RTK surveys used to obtain GPS measurements in the field.

UNIT-I

Overview of GNSS and Introduction to GPS, GLONASS, GALILEO, COMPASS, IRNSS systems

GPS: Basic concepts, Functional system of GPS – Space segment, control segment and user segment, Working principle of GPS, Signal structure and code modulation, Pseudo-range measurements and navigation position

UNIT-II

Errors and biases in GPS measurements, Accuracy of navigation position: UERE and DOP, Intentional degradation of GPS signals: Selective availability (SA) and Anti-spoofing (AS)

Differential GPS: Space based augmentation systems (e.g., SBAS, GAGAN) and Ground based augmentation systems (e.g., WASS, EGNOS)

UNIT-III

GPS Carrier Phase measurements: Signal Differencing, Double Differencing and Triple Differencing in GPS measurements.

UNIT-IV

Surveying with GNSS: Point positioning, Relative positioning, Static and Kinematic positioning.

GNSS applications: GIS and GPS integration

Learning Resources:

1. Leick, A., GPS Satellite Survey, John Wiley: NJ, 2015
2. Hofmann, B., Lichtenegger H. and Collins J., Global Positioning System: Theory and Practice, Springer: Berlin, 2011.
3. Hofmann-Wellenhof, Bernhard, Lichtenegger, Herbert, Wasle, Elmar, GNSS – GPS, GLONASS, Galileo and more, 2013.

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE V-SEMESTER
PROJECT MANAGEMENT (Open Elective – V)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code : OE540CE
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The objectives of the course are to</i>	<i>Upon the completion of the course, students are expected to</i>
<ol style="list-style-type: none">1. Learn the concept of project management along with functions and objectives.2. Understand the various techniques used for project planning such as bar charts, CPM, PERT and crashing of networks.3. Acquire knowledge on various types of contracts, tenders.	<ol style="list-style-type: none">1. Understand the objectives, functions and principles of management in projects.2. Practice the network techniques like CPM and PERT for better planning and scheduling of engineering works.3. Analyse the importance of cost and time in network analysis and planning the work accordingly.4. Knowledge on Contracts, Tenders, and Work orders related to the projects.

UNIT-I

Significance of Project Management: Objectives and functions of project management, management team, principles of organization and types of organisation.

UNIT-II

Project Planning: Planning, bar charts, network techniques in project management - CPM and PERT. Expected likely, pessimistic and optimistic time, normal distribution curve and network problems.

UNIT-III

Contracts: Introduction, types of contracts and their advantages and disadvantages, conditions of contracts, Introduction to Indian contract act.

UNIT-IV

Time Cost Analysis: Cost time analysis in network planning, updating

Tender: Tender form, Tender Documents, Tender Notice, Work Order.

Learning Resources:

- 1.Srinath L.S., PERT and CPM: Principles and Application, East-West Press, 1975.
- 2.Peret, F, Construction Project Management an Integrated approach, Taylor and Francis, Taylor and Francis Group, London & New York, 2009
- 3.Punmia B.C., and Khandelwal, PERT and CPM, Laxmi Publications, 1990.
- 4.<http://nptel.ac.in/courses/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
INTRODUCTION TO SOFTWARE ENGINEERING (Open Elective-IV)
(for other Departments)

Instruction: 1 Hr /week	SEE Marks :50	Course Code :OE510CS
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">• Understand the concepts involved in the lifecycle of software development• Learn the best practices to be employed for the design and testing.	<ol style="list-style-type: none">1.Explain the various software development lifecycle models for a software system development.2.Build the prototype for software business case and analyze the requirements of software project.3.Analyze the different behavioral and structural models for the designed object oriented system.4.Identify verification and validation methods in a software engineering project and implement testing methods at various phases of SDLC

UNIT-I

Introduction to Software Engineering:

A generic view of Process: Software Engineering, Process Framework CMM Process Patterns, Process Assessment.

Process Models: Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.

An Agile view of Process: What is Agility, What is an Agile Process, Agile Process Models.

Requirements Engineering: A bridge to Design and Construction, Requirements Engineering Tasks, Initiating Requirements Engineering Process, Eliciting Requirements, Negotiating Requirements, Validating Requirements.

UNIT-II

Object oriented Modeling & design using UML: Introduction to UML.

Structural Modeling: Classes and Advanced Classes, Relationships and Advanced Relationships, Common Mechanisms, Class Diagrams.

Behavioural Modelling: Interactions, Interaction diagrams, Use Cases, Use Case Diagrams, Activity diagrams, State Machines, State chart Diagrams.

Testing Tactics: Software testing fundamentals, Black box and White box testing.

Suggested Books:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, 6th Edition (2005), Tata McGrawHill.
2. Grady Booch, James Rumbaugh, Ivor Jacobson, The Unified Modeling Language-User guide, (Covering UML 2.0) ,2nd Edition (2007), Pearson Education, India.

Reference Books:

1. Shari Lawrence Pfleeger, Software engineering Theory and Practices, 4th Edition (2011), Pearson Education, India.
2. Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition (2005), Narosa Publishing House.

Online Resources:

1. <http://nptel.ac.in/courses/106101061/>
2. <https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineering-concepts-fall-2005/lecture-notes/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E V SEMESTER
INTRODUCTION TO JAVA PROGRAMMING (Open elective-V)
(for other Departments)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code :OE520CS
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, Students will be able to
<ul style="list-style-type: none">• Apply object oriented principles for developing an application using Java constructs• Design GUI using existing Java classes and interfaces	<ol style="list-style-type: none">1. Apply the object oriented programming (OOP) concepts to design an application.2. Employ runtime error handling, concurrent programming practices to develop a parallel processing application3. Read and write the IO operations using console and files streams4. Design dynamic GUI for a java application using AWT classes

UNIT – I

Java Programming Fundamentals: Introduction, Overview of Java, Data types, Variables and Arrays, Operators, Control Statements, Classes and Methods, Garbage Collection, this keyword, final, Inheritance, Method Overriding.

UNIT – II

Abstract class, Nested class, Interface, Package, Exception Handling, Multithreaded Programming, String Handling.

UNIT - III

Util: String Tokenizer, Date, Calendar, Random, Timer, Observable

IO: Java I/O Classes and Interfaces, Files and Directories, Byte and Character Streams

UNIT – IV

GUI and event Programming: Applet Class, Applet architecture, The Delegation Event Model, Event Classes, Source of Events, Events Listener Interfaces, AWT: Classes, Working with Graphics, Frames, Menu, Layout Managers.

Suggested Books:

1. Herbert Schildt, *The Complete Reference Java*, 7th Edition, Tata McGraw Hill 2005.

Reference Books:

1. P. Radha Krishna, *Object Oriented Programming through Java*, Universities Press, 2007.
2. Sachin Malhotra, Saurabh Choudhary, *Programming in Java*, 2nd Edition, Oxford Press, 2014.

Online Resources:

1. <https://docs.oracle.com/javase/tutorial/java>

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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
INTRODUCTION TO TELEMETRY (Open Elective -IV)
(for other Departments)

Instruction: 1 Hrs /week	SEE Marks :50	Course Code : OE510EC
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objective	Course Outcomes
1. To understand the concept of telemetry systems.	At the end of the course, students will be able to: <ol style="list-style-type: none">1. Analyze different components of telemetry systems.2. Acquire knowledge on wired and wireless data acquisition techniques in telemetry systems.3. Demonstrate the knowledge on satellite telemetry systems.4. Apply techniques of different telemetry systems in real time applications.

UNIT - I

Introduction to Telemetry Principles: Introduction, the Basic System, Classification, Non-electrical Telemetry Systems, Voltage and Current Telemetry Systems, Local Transmitters and Converters, Frequency Telemetry, Power Line Carrier Communication (PLCC).

Wave Propagation: Space Propagation of Waves, Surface Wave, the Ionosphere, Some Considerations on Space Wave Propagation.

UNIT - II

Basics of Satellite Telemetry, Introduction, General Considerations, TT & C Services, Digital Transmission System in Satellite Telemetry, TDM, Some Aspects of TT&C – Subsystems, Satellite Telemetry and Communications: MA Techniques.

Fiber Optic Telemetry: Introduction, Optic Fiber Cable, Dispersion, Losses, Connectors and Splices, Sources and Detectors, Transmitter and Receiver Circuits, Coherent Optical Fiber Communication System, Wavelength Division Multiplexing.

Suggested Reading:

1. D. Patranabis, Telemetry Principles, Tata McGraw-Hill, 1999
2. Swoboda G., Telecontrol Methods and Applications of Telemetry and Remote Control, Reinhold Publishing Corp., London, 1991
3. Young R.E., Telemetry Engineering, Little Books Ltd., London, 1988
4. Gruenberg L., Handbook of Telemetry and Remote Control, McGraw Hill, New York, 1987.

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
INTRODUCTION TO SIGNAL PROCESSING (Open Elective -V)
(for other Departments)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code : OE520EC
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
1. To Introduce the basics of Signals and Systems, and the principles of Digital Signal Processing (DSP). To design digital filter using frequency domain concepts.	At the end of the course, students will be able: 1. To classify discrete time signals as energy and power and to classify discrete time systems as causal-non causal, linear-nonlinear and stable-unstable. 2. To study the properties of discrete time Fourier transform, discrete Fourier transform and z-transform. 3. To implement the DFT using FFT for the given sequence. 4. To realize digital filter structures from their z-transform. 5. To apply DSP techniques to audio, image processing and telecommunication areas.

UNIT – I

Introduction to signals: Definition, Representation, Elementary Signals: Unit Impulse, Unit Step, Unit Ramp, Rectangular and Triangular, Classification of signals: periodic and non-periodic, Energy and Power, even and odd, Basic operations on signals such as shifting, scaling and reversal.

UNIT – II

Introduction to Discrete Time Systems: Definition, Classification of systems: Linear and Non-linear, Time Invariant and Time Variant, Causal and Non-causal, Stable and Unstable, Introduction to LTI systems, Properties of an LTI system and linear convolution.

UNIT – III

Discrete Transform Techniques: Discrete Time Fourier Transform and its properties, Discrete Fourier Transform and its properties, Circular

convolution, Twiddled factor and its properties, Introduction to FFT algorithms, Z-transform and its properties, transfer function.

UNIT – IV

A Frame work for digital filter design: Types of digital filters, Ideal filter characteristics, Specification of practical filters, Design of FIR filters using windowing techniques, Design of Digital IIR Low Pass Filter using butterworth approximation, realization of filter structures. Some Application Areas of DSP.

Suggested Readings:

1. Rao, K. Deerga, Swamy M.N.S., "Digital Signal Processing – Theory and Practice", 1st edition, Springer, 2018.
2. Ifeachor, E.C. and Jerris, B.W., "Digital Signal Processing: A practical Approach," 2nd edition, Pearson Education.
3. Tan, Li, "Digital Signal Processing – Fundamentals and Applications", Academic Press.
4. Mitra, S.K., "Digital Signal Processing – A Computer Based Approach", 3rd Ed., Tata McGraw-Hill.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
SYLLABUS OF B.E V- SEMESTER
BASICS OF POWER SYSTEMS (Open Elective –IV)

Instruction: 1 Hrs /week	SEE Marks :50	Course Code :OE510EE
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course objective:	Course Outcomes:
Electrical Power plays significant role in day to day life of entire mankind. This course gives an over view of electrical power generation and economic aspects of power to all engineers of all disciplines.	At the end of the course, students will be able to: <ol style="list-style-type: none">1. Identify the various and major ways of generation of Power in India.2. Estimate the Energy generated by Hydel Generating station.3. Calculate the Capacitance value for P.f. improvement.4. Assess the Tariffs of domestic and commercial.

UNIT – I

Thermal Power Station: Line diagram of Thermal Power Station (TPS) showing paths of coal, steam, water, air, ash and flue gasses. Brief description of TPS components-Economizers, Boilers, Super heaters, Turbines, Condensers, Chimney and cooling towers.

Hydro Power Stations: Power Generation Principles, Choice of site, layout and various parts of generating stations, Estimation of power in Hydel, flow duration curve, hydrograph, mass curve etc. Types of Hydel stations.

UNIT – II

Nuclear Power Stations: Nuclear Fission and Chain reaction, Nuclear fuels, Principle of operation of Nuclear reactor, Reactor Components-Moderators, Control rods, Reflectors and Coolants, Radiation hazards-Shielding and Safety precautions.

Economics of Power Generation: Load Curve, load demand and diversity factors, base load and peak load operation, types of costs and depreciation fund calculations, Tariffs.

Power Factor: Causes of low P.F, Improving power factor ,Methods of power factor improvement, Numerical problems.

Suggested Reading

1. C.L. Wadhwa, Electrical Power Systems, Wiley Eastern Ltd. 5th Edition, 2005
2. C.L. Wadhwa, Generation, Distribution and Utilisation of Electrical Energy, Wiley Eastern Ltd., 5th Edition, 2005
3. S.N.Singh- Electrical Power Generation, Transmission and Distribution- Prentice Hall Pvt.Ltd. New-2003.

DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING
SYLLABUS OF B.E V- SEMESTER
FUNDAMENTALS OF POWER ELECTRONICS (Open Elective –V)

Instruction: 2Hrs /week	SEE Marks :70	Course Code :OE520EE
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course objective:	Course Outcomes:
To provide fundamentals of power semi-conductor devices and power electronics converters in power electronics.	At the end of the course, students will be able to: <ol style="list-style-type: none">1. Categorize and compare power electronic devices.2. Explain the operation of AC-DC, DC-DC and DC-AC converters.3. Explain the control strategies of Choppers and PWM techniques in inverters.4. Analyze and select the appropriate converter for a given application.

Unit –I Power Semi – conductor Switches:

Operation and static characteristics of power diode, SCR, MOSFET and IGBT, applications.

Unit – II AC – DC Converters:

Operation of 1 – ϕ half wave rectifiers with R, R – L and R – L – E loads, operation of 1 – ϕ bridge type full and semi – converters with R – L – E load, applications.

Unit – III Choppers:

Operation of step down and step up choppers, control strategies, applications.

Unit – IV DC – AC Converters:

Operation of 1 - ϕ inverters, operation of 3 - ϕ inverters – 180° and 120° mode, pulse width modulation techniques, applications.

Learning Resources:

1. Bimbra.P.S, *Power Electronics*, Third Edition, Khanna Publishers, 2012.
2. Singh, M.D and Khanchandani, K.B, – *Power Electronics*, Tata McGraw Hill, 2nd Edition, 2006.
3. Rashid, M.H – *Power Electronics: Devices, Circuits and Applications*, Pearson, 2003
4. Mohan, Undeland, Robbins, *Power Electronics – Converters, Applications and Design*, Wiley India Pvt Ltd, 2010.

DEPARTMENT OF INFORMATION TECHNOLOGY
Syllabus for B.E V- SEMESTER
INTRODUCTION TO LINUX (Open Elective - IV)

Instruction: 1Hrs/ week	SEE Marks : 50	Course Code : OE510IT
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Acquire basic skills for using Linux operating system.	<ol style="list-style-type: none">1. Install Linux operating system and use desktop environment.2. Identify and use Linux utilities to create and manage simple file processing operations.3. Organize directory structures with appropriate security.4. Configure and use Linux shell.

Unit I

Introduction to Linux, Installing Linux, Running Linux from USB Drive Understanding X Windows System and Desktop, Navigating through Linux Desktop and Managing files. Understanding Linux file system, listing files and directory attributes , Making files and directories, Listing and changing permissions and ownership.

Unit II

Understanding the Linux Shell, Understanding aliases, Using the shell from console or terminals, Using command history and tab completion, Connecting and expanding commands, Creating aliases, Making shell settings permanent, Using man pages and other documentation.

Learning resources:

Introduction to Linux – A Hands On Guide, Machtelt Garrels.
<https://linuxjourney.com/>

DEPARTMENT OF INFORMATION TECHNOLOGY

Syllabus for B.E V- SEMESTER

INTRODUCTION TO JAVA PROGRAMMING LANGUAGE (Open Elective - V)

Instruction: 2Hrs/ week	SEE Marks : 70	Course Code : OE520IT
Credits : 2	CIE Marks: 30	Duration of SEE : 3Hours

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Acquire skills to write basic Java programs.	1. Use arrays to store multiple data elements. 2. Organize programs logically with the usage of packages. 3. Create, throw and handle exceptions. 4. Perform basic Input Output file operations.

Unit I

Java Programming Fundamentals: Introduction, Overview of Java, structure of a Java program, data types, variables-scope and lifetime, operators, control statements, classes, methods, command line arguments.

Unit II

Arrays: one-dimensional arrays, creating an array, declaration of arrays, initialization of arrays, two dimensional arrays. Inheritance, Interfaces: defining interfaces, extending interfaces, implementing interfaces.

Unit III

Packages: creation, importing a package and user defined packages.

Exception Handling: Introduction, types of exceptions, syntax of exception handling code, multiple catch statements, using finally statement, user-defined exceptions.

Unit IV

Basic I/O Streams: Java I/O classes and interfaces, Files, Stream and Byte classes. Character Streams, Serialization.

Exploring java.lang: Object, Wrapper classes, String, String Buffer.

Suggested Reading:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2006.
2. James M Slack, Programming and Problem solving with JAVA, Thomson Learning, 2002.
3. C Thomas Wu, An Introduction to Object Oriented Programming with Java 5th edition, McGraw Hill Publishing, 2010.
4. Y. Daniel Liang, An Introduction to JAVA Programming, TMHI, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
BASICS OF 3-D PRINTING (Open Elective-IV)

Instruction : 1 Hour/week	SEE Marks : 50	Course Code : OE500ME
Credits : 1	CIE Marks :30	Duration of SEE : 2Hours

Course Objectives	Course Outcomes
The objective of the course is to <ul style="list-style-type: none">understand the fundamentals of various rapid prototyping technologies with emphasis on FDM technology for application to various industrial needs.	After completion of the course, the student will be able to <ol style="list-style-type: none">understand the fundamentals of Additive manufacturing Technologies for engineering applications.Understand the methodology to manufacture the products using FDM technologystudy the applications, advantages and case studies of FDM technology.identify different industrial sectors for application of AMT to reduce manufacturing cost and time.

UNIT-I

Introduction, Reverse engineering and its Methodology, Historical development, Advantages of 3-D printing, 3-D printing process chain, Classification of various 3-D printing processes.

Fused Deposition Modeling (FDM): Models and specifications, Process, Working principle, Applications, Advantages and disadvantages, Case studies, Practical demonstration

UNIT-II

Applications of 3-D printing in various fields like aerospace, jewellery, medicine, forensic science and anthropology, visualization of bio-molecules, etc.

Learning Resources:

1. C K Chua, K F Leong, C S Lim, "Rapid Prototyping – Principles and applications", 3rd Ed., World Scientific Publishing Co. Pvt. Ltd, 2010
2. Pham, D.T. and Dimov S.S., "Rapid Manufacturing", Springer, 2001
3. AmithabaGhose, "Rapid prototyping", Eastern Law house, 1997
4. Paul F. Jacobs, "Rapid Prototyping & Manufacturing" ASME Press, 1996

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
INTRODUCTION TO ROBOTICS (Open Elective-V)

Instruction: 2 Hours /week	SEE Marks : 70	Course Code : OE510ME
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to: Identify robots and its peripherals for satisfactory operation and control of robots for industrial and non-industrial applications.	On completion of the course, the student will be able to 1. list and explain the basic elements of industrial robots 2. analyse robot kinematics and its control methods. 3. Classify the various sensors used in robots for better performance. 4. summarize various industrial and non-industrial applications of robots.

UNIT I - ROBOT BASICS

Robot-Basic concepts, Need, Law, History, Anatomy, specifications.
Robot configurations-cartesian, cylinder, polar and articulate.
Robot wrist mechanism, Precision and accuracy of robot.

ROBOT ELEMENTS

End effectors-Classification, Types of Mechanical actuation, Gripper design,
Robot drive system
Types, Position and velocity feedback devices-Robot joints and links-Types,
Motion interpolation.

UNIT II - ROBOT KINEMATICS AND CONTROL

Robot kinematics – Basics of direct and inverse kinematics, Robot trajectories, 2D and 3D Transformation-Scaling, Rotation, Translation Homogeneous transformation.
Control of robot manipulators – Point to point, Continuous Path Control, Robot programming

UNIT III - ROBOT SENSORS

Sensors in robot – Touch sensors-Tactile sensor – Proximity and range sensors. Force sensor-Light sensors, Pressure sensors,
Introduction to Machine Vision and Artificial Intelligence.

UNIT IV - ROBOT APPLICATIONS

Industrial applications of robots, Medical, Household, Entertainment, Space, Underwater, Defense, Disaster management. Applications, Micro and Nanorobots, Future Applications.

Learning Resources:

1. Mikell P. Groover, Mitchell Weiss, Roger N Nagel, Nicholas G Odrey, "Industrial Robotics Technology, Programming and Applications", Tata – McGraw Hill Pub. Co., 2008.
2. Deb.S.R and Sankha Deb, "Robotics Technology and Flexible Automation", Tata McGraw Hill Publishing Company Limited, 2010.
3. Klafter.R.D, Chmielewski.T.A, and Noggin's., "Robot Engineering: An Integrated Approach", Prentice Hall of India Pvt. Ltd., 1994.
4. Fu.K.S, Gonzalez.R.C&Lee.C.S.G, "Robotics control, sensing, vision and intelligence", Tata- McGraw Hill Pub. Co., 2008
5. , Yu. "Industrial Robotics", MIR Publishers Moscow, 1985.

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
BASICS OF ENTREPRENEURSHIP (Open Elective-V)

Instruction : 2 Hours / week	SEE Marks : 70	Course Code : OE520ME
Credits : 2	CIE Marks : 30	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objectives of this course are to : <ul style="list-style-type: none">• understand and discover entrepreneurship• build a strong foundation for the students to start, build and grow a viable and sustainable venture• develop an entrepreneurial outlook and mind set, critical skills and knowledge	On completion of the course the student will be able to: <ol style="list-style-type: none">1. understand entrepreneurship as a career option and develop customers, channels and traction2. understand the method of creating business model and make a minimum viable product.3. develop costing and pricing strategies4. understand team building and its importance5. create marketing and sales strategies for business and understand business regulations and government schemes.

UNIT-I

Introduction to Entrepreneurship: Define Entrepreneurship, Entrepreneurship as a career option, Benefits and Myths of Entrepreneurship, Characteristics, Qualities and Skills of Entrepreneurship on Economy and Society

Opportunity and Customer Analysis: Identify your Entrepreneurial Style, Identify Business Opportunities, Methods of finding and understanding Customer Problems, Process of Design Thinking, Identify Potential Problems, Customer Segmentation and Targeting, Customer Adoption Process, Craft your Value Proportions, Customer-Driven Innovation.

UNIT-II

Business Model and Validation: Types of Business Models, Lean Approach, the Problem-Solution Test, Solution Interview Method, Difference between Start-up Venture and small Business, Industry Analysis,

Identify Minimum Viable Product (MVP), Build-Measure-Learn Feedback Loop, Product-market fit test.

UNIT-III

Economics and Financial Analysis: Revenue sources of Companies, Income analysis and Cost Analysis-Product Cost and Operation Cost, Basics of Unit Costing, Profit Analysis, Customer Value Analysis, Different Pricing Strategies, Investors Expectations, Practice Pitching to Investors and Corporate.

UNIT-IV

Team Building and Project Management: Leadership Styles, Team Building in Venture, Role of good team in Venture, Roles and Respondents, Explore Collaboration Tools and Techniques-brainstorming, Mind Mapping. Importance of Project Management, Time Management, Work Flow, Network Analysis Techniques.

Marketing & Business Regulations: Positioning, Positioning Strategies, Building Digital Presence and Leveraging Social Media, Measuring effectiveness of Channels, Customer Decision-making Process, Sales plans and Targets, Unique Sales Proposition (USP), Follow-up and Close Sales. Business Regulations of starting and operating a Business, Start-up Ecosystem, Government schemes.

Learning Resources:

1. Robert D Hisrich, Michael P Peters, Dean A Shepherd, "Entrepreneurship", Sixth edition, New Delhi, 2006.
2. Thomas W. Zimmerer, Norman M. Scarborough, "Essentials of Entrepreneurship and small business Management", Fourth edition, Pearson, New Delhi, 2006.
3. Alfred E. Osborne, "Entrepreneurs Toolkit", Harvard Business Essentials, HBS Press, USA, 2005
4. Madhurima Lall and Shikha Sahai, "Entrepreneurship", Excel Books, First Edition, New Delhi, 2006

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. V SEMESTER
DISPLAY DEVICES (Open Elective-IV)

Instruction :1 Hours / week	SEE Marks :50	Course Code : OE400PH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

Course objectives	Course outcomes
Students will be able to learn <ul style="list-style-type: none">• Basics of luminescence and display devices	At the end of the course students will be able to <ol style="list-style-type: none">1. List out different types of luminescence mechanisms2. Classify types of display devices3. Explain working of some display devices4. Compare the output intensities emitted by LED, OLED et

UNIT-I:

Introduction to Luminescence, fluorescence, phosphorescence, principle and classification, luminescence mechanisms for various types and its applications.

UNIT-II:

Classification of display devices, working of Liquid crystal displays, comparison of LED and LCD, dynamic scattering display, OLEDs and their applications.

SUGGESTED BOOKS:

1. S. W. S. McKeever, Thermoluminescence of Solids, Cambridge University Press, 1988
2. Adrian Kita, Luminescent Materials and Applications, John Willey & Sons

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. V SEMESTER
FUNDAMENTALS OF VACUUM TECHNOLOGY (Open Elective-IV)

Instruction :1 Hours / week	SEE Marks :50	Course Code : OE410PH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

Course objectives	Course outcomes
Students will be able to learn <ul style="list-style-type: none">• Fundamentals of vacuum technology	At the end of the course students will be able to <ol style="list-style-type: none">1. Define basic vacuum technology related notations.2. Enumerate methods production of vacuum.3. List out different vacuum gauges and their limitations.4. Identify types of vacuum leaks.

UNIT-I:

Definition of vacuum, units of vacuum, vacuum ranges, evaporation theory- rate of evaporation, Hertz- Knudsen equation, types of evaporation, adsorption, desorption, Production of Vacuum, vacuum measurement, Vacuum pumps: pumping speed, throughput, Rotary oil pump, multi stage rotary pumps, diffusion pump, cryo-pump. Vacuum applications in various areas of engineering.

UNIT-II:

Measurement of vacuum, Vacuum gauges: thermocouple gauge, Pirani gauge, ionization gauge, Penning gauge, leak detection, Leak detection methods

SUGGESTED BOOKS:

1. M. N. Avadhanulu and P.G. Kshirsagar, Textbook of Engineering Physics, Revised Edition, S.Chand, 2015
2. Dr. V.V. Rao, Dr. T.B. Gosh, Dr. K.L. Chopra, Vacuum Science and Technology, Allied Publishers, New Delhi, 2008
3. John F. O'Hanlon A User's Guide to Vacuum Technology, Jhon Willey and sons, 2006

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. V SEMESTER
INTRODUCTION TO NON- DESTRUCTIVE TESTING (Open Elective-IV)

Instruction :1 Hours / week	SEE Marks :50	Course Code : OE420PH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

Course objectives	Course outcomes
Students will be able to learn <ul style="list-style-type: none">Basics of acoustics and non-destructive testing	At the end of the course students will be able to <ol style="list-style-type: none">1. Illustrate non-destructive testing2. Explain production mechanisms of ultrasonics3. Differentiate various methods of non-destructive testing4. Compare the non-destructive testing methods and identify suitable one for given application.

UNIT-I:

Ultrasonic waves and their properties, Production of ultrasonics by Piezo-electric and magnetostriction methods, Detection of ultrasonics, Acoustic grating: ultrasonic velocity measurement, cavitation, Applications: ultrasonic cleaning, Echo cardiogram (ECG), ultrasonic imaging.

UNIT-II:

Introduction to non- destructive testing (NDT)- objectives of NDT- advantages- types of defects-methods of NDT: Visual inspection, liquid penetration testing, acoustic detection: pulse echo method, ultrasonic inspection methods, Radiography: x-ray and gamma ray, Electromagnetic: eddy current testing, Acoustic Emission, Ultrasonic Testing (UT)

SUGGESTED BOOKS:

1. B.K. Pandey and S. Chaturvedi, Engineering Physics, Cengage learning, 2014
2. M. N. Avadhanulu and P.G. Kshir Sagar, Textbook of Engineering Physics: Revised Edition, S.Chand, 2015
3. R K Gaur and S L Gupta, Engineering Physics, Dhanpat Rai, 2012

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. V SEMESTER
FUNDAMENTALS OF CRYOGENICS (Open Elective-IV)

Instruction :2 Hours / week	SEE Marks :70	Course Code : OE430PH
Credits : 2	CIE Marks :30	Duration of SEE : 3 Hours

Course objectives	Course outcomes
Students will be able to learn <ul style="list-style-type: none">• Liquefaction of gases• Fundamentals of cryogenics	At the end of the course students will be able to <ol style="list-style-type: none">1. Define ranges of liquid temperatures2. Narrate regenerative and cascade cooling processes.3. Enumerate properties and use of cryogenic fluids.4. Explore applications and use of cryostats and cryocoolers.

UNIT-I:

Introduction to low temperature Physics- Porous plug experiment: Joule Thomson effect, Theory of porous plug experiment- J-K effect for a Van der Waal's gas. Relation between inversion temperature, Boyle temperature and critical temperature.

UNIT-II:

Gas-Liquefaction-Regenerative cooling and cascade process- Liquefaction of air: Linde Process, Liquefaction of hydrogen, nitrogen, helium and oxygen.

UNIT-III:

Properties of cryogenic helium and Properties of Materials at Cryogenic Temperatures.

UNIT-IV:

Adiabatic demagnetization, practical applications of low temperatures, super fluidity Liquid He-II and He-III cryostat- Cryocoolers, Cryogenic Insulations-applications.

SUGGESTED BOOKS:

1. D.S. Mathur, Heat and thermodynamics, S. Chand & Co, 2008
2. Mamata Mukhopadhyay, Fundamentals of Cryogenic Engineering, PHI, 2010

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. V SEMESTER
SMART MATERIALS AND APPLICATIONS (Open Elective-IV)

Instruction :2 Hours / week	SEE Marks :70	Course Code : OE440PH
Credits : 2	CIE Marks :30	Duration of SEE : 3 Hours

Course objectives	Course outcomes
Students will be able to learn <ul style="list-style-type: none">• Essentials of smart materials• Different types of smart materials	At the end of the course students will be able to <ol style="list-style-type: none">1. List out various properties of functional materials2. Identify smart materials based on properties and their appropriate usage.3. Write different types of smart materials4. Categorize suitable alloys for specific application.

UNIT I:

Introduction to functional materials, ferroelectricity, piezo electricity, pyroelectricity, Magnetostriction. Properties of smart materials such as piezo electric, magneto-strictive, electro-strictive, thermos-responsive

UNIT-II:

Electrochromic materials, photochromic materials, thermo-chromic materials, thermoelectric materials, smart gels, electro-rheological (ER) and Magnetorheological MR fluids

UNIT III:

Introduction to metal alloys, classification of metal alloys as ferrous and non-ferrous alloys. Properties and applications of ferrous and non-ferrous alloys.

Introduction to shape memory alloys (SMA)- advantages and disadvantages of SMAs- Austenite, martensite, shape memory effect and types of shape memory effects- temperature transformation

UNIT IV:

Properties and characteristics of engineering SMAs - Ni-Ti shape memory alloy, Cu-based shape memory alloys: Cu-Zn-Al, Cu-Al-Ni, ferromagnetic shape memory alloys Applications of SMAs.

SUGGESTED BOOKS:

1. K. Otsuka and C. M. Wayman, Shape memory Alloys, Cambridge University Press, 1999
2. Dimitris C. Lagoudas Shape Memory Alloys: Modeling and Engineering Applications, Springer, 2013
3. Vijay K. Varadan, K. J. Vinoy, S. Gopalakrishnan, Smart Material Systems and MEMS, John Wiley & Sons, 2006

DEPARTMENT OF PHYSICS
SYLLABUS FOR B.E. V SEMESTER
FUNDAMENTALS OF THIN FILM TECHNOLOGY (Open Elective-IV)

Instruction :2 Hours / week	SEE Marks :70	Course Code : OE450PH
Credits : 2	CIE Marks :30	Duration of SEE : 3 Hours

Course objectives	Course outcomes
Students will be able to learn <ul style="list-style-type: none">• Fundamentals of thin film technology• Properties and preparation mechanisms	At the end of the course students will be able to <ol style="list-style-type: none">1. Differentiate bulk materials and thin films2. Explore growth process of thin films.3. List out various thin film preparation techniques.4. Narrate properties of thin films

UNIT-I:

Classification of films- nucleation and growth- nucleation theories: capillarity and atomistic models, substrate effect, film thickness effect.

UNIT-II:

Thin film deposition techniques- simple thermal evaporation-electron beam evaporation-sputtering (d.c and a.c), flash evaporation, Laser ablation- spin coating- molecular beam epitaxy- Film thickness measurement- ellipsometry, Fizeu (Tolonsky) technique, quartz crystal oscillator techniques.

UNIT-III:

Electrical conduction in metallic films- Continuous and discontinuous films, electrical, optical and dielectric properties of thin films

UNIT-IV:

fabrication of thin film resistor, capacitor, diode, anti-reflection coatings, gas sensors and temperature sensors.

SUGGESTED BOOKS:

1. Kasturi Chopra Thin Film Device Applications, Mac Graw Hill, New York, 2012
2. A. Goswami, thin film fundamentals, New age international, 2006
3. K.L. Chopra, thin film phenomenon, Mac Graw Hill, New York, 1990

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. V SEMESTER
ELECTRONIC ENGINEERING MATERIALS (Open Elective-IV)

Instruction :1 Hours / Week	SEE Marks :50	Course Code : OE400CH
Credits : 1	CIE Marks :30	Duration of SEE :2 Hours

OBJECTIVES	OUTCOMES
The course will enable the students:	At the end of the course students should be able to:
<ol style="list-style-type: none">1.To familiarize with various types of liquid crystals, their chemical constitution and behavior2.To acquaint with different types of sensors and chemistry involved in them3.To discuss the conductance in polymers and mechanism of conductance in undoped and doped polymers	<ol style="list-style-type: none">1. Explain the classification, types and applications of liquid crystals2.Discuss the principles, mechanism and applications of potentiometric and amperometric sensors3.Explain the principle, mechanism and applications of fluorophore based, chromophore based and enzyme based fibre optic biosensors4.Discuss the mechanism of conduction in undoped and doped polymers and applications of conducting polymers

UNIT-I: Liquid Crystals

Introduction, Classification: Thermotropic and Lyotropic liquid crystals. Chemical constitution & liquid crystalline behavior. Molecular ordering in liquid crystals: Nematic, Smectic and Cholesteric. Applications.

UNIT-II: Conducting Polymers and Sensors

a) Conducting Polymers: Introduction, Classification: Extrinsic and Intrinsic Conducting Polymers. Mechanism of conduction of doped and undoped polyacetylene & Polyaniline. Applications.

b) Sensors: Introduction, Potentiometric sensors, Amperometric sensors, Fluoride-ion-selective electrode. Fluorophore and Chromophore based Fiber-optic Biosensors. Enzyme Based Nonmediated Fiber Optic Biosensors.

Suggested Reading:

4. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)

5. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
2. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning
3. A textbook of Polymer Science: Fred, Billmeyer Jr., Wiley India Third edition.
4. Chemistry of Advanced Materials: CNR Rao, RSC Publication
5. Billmeyer F. W., "Text book of Polymer Science", Wiley-Inter Science, New York, 2002.
6. Arora M. G., Singh M and Yadav M.S, "Polymer Chemistry", Anmol Publications, New Delhi, 2003.

Online resources:

1. www.nptel.ac.in
2. <http://ndl.iitkgp.ac.in>
3. <http://ocw.mit.edu>

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. V SEMESTER
POLYMER TECHNOLOGY (Open Elective-IV)

Instruction :1 Hours / Week	SEE Marks :50	Course Code : OE410CH
Credits : 1	CIE Marks :30	Duration of SEE :2 Hours

OBJECTIVES	OUTCOMES
The course will enable the students:	At the end of the course students should be able to:
<ol style="list-style-type: none">1. To familiarize with various types of polymers and polymerization methods and effect of their structure on properties.2. To acquaint with different types of moulding techniques.3. To discuss the reinforced plastics and biomedical applications of polymers	<ol style="list-style-type: none">1. Explain the classification and types of polymerization methods2. Discuss the moulding constituents and moulding techniques.3. Discuss the different polymer blends and engineering plastics.4. Choose the polymers for different applications.

UNIT-I: Introduction, classification of polymers, methods of polymerization-Condensation polymerization (High temperature and low temperature methods), addition polymerization-bulk polymerization, solution polymerization, emulsion polymerization and suspension polymerization. Effect of polymer structure on properties.

UNIT-II: Moulding constituents of plastic, moulding techniques-Compression moulding, injection moulding, and extrusion moulding. Reinforced plastics, polymer blends and alloys, engineering plastics-polyamides, polycarbonates, polyurethanes. Polymers in medicine, biomedical applications of polymers.

Suggested Reading:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, New Delhi (2008).
3. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
4. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. V SEMESTER
INDUSTRIAL POLLUTION PREVENTION AND CONTROL(Open Elective-IV)

Instruction :1 Hours / Week	SEE Marks :50	Course Code : OE420CH
Credits : 1	CIE Marks :30	Duration of SEE : 2 Hours

OBJECTIVES	OUTCOMES
The course will enable the students :	At the end of the course students should be able to:
1. An overview of pollution in industries 2. Principles of various processes the treatment of air and water pollution	1. Explain the causes of pollution. 2. Describe the various sources of pollution. 3. Understand the effects of uncontrolled emissions. 4. Apply various methods to dispose the waste and minimize the pollution.

UNIT-I : Introduction, types of industrial waste, definition of pollutant, air pollutants- gases, hydro carbon pollutants, particulates - inorganic and organic particulates- effects of particulate pollutants, chlorofluro carbons(CFC)- cause of ozone depletion- harmful effects of cfc,photo chemical smog, air pollutant control methods: particulate emission control-gravitational setting chambers-cyclone separators, fabric filters, electrostatic precipitators.

UNIT-II: Water pollution: Definition of water pollution, types of water pollutants- Inorganic pollutants, toxic metals, organic pollutants, detrimental effects of Inorganic pollutants, toxic metals and organic pollutants, water pollution control methods-primary and secondary treatment.

Treatment and disposal of industrial wastes, treatment of wastes or effluents with organic impurities, treatment of wastes or effluents with inorganic impurities, the nature, effect and treatment of some important chemical wastes. Case study.

Suggested Reading:

1. B K Sharma, "Industrial Chemistry", GOEL publishing house, Meerut.
2. Pandey.G.N and Carney.G.C, "*Environmental Engineering*", Tata McGrawHill, New Delhi,1989
3. Rose.G.R.D, "*Air pollution and Industry*", Van Nostrand Reinhold Co., NewYork 1972
4. Freeman HM, "Industrial pollution prevention hand book", McGraw Hill.
5. James G Mann and Liu Y A, "Industrial water reuse and waste water minimization, McGraw Hill.

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. V SEMESTER
ELECTROCHEMICAL ENERGY SYSTEMS (Open Elective-IV)

Instruction :2 Hours / Week	SEE Marks :70	Course Code : OE430CH
Credits : 2	CIE Marks :30	Duration of SEE : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the students :	At the end of the course students should be able to:
<ul style="list-style-type: none">• To introduce the various terms to understand the efficiency of batteries.• To know the relevant materials required for the construction of primary and secondary batteries.• To familiarize with the reactions involved during charging and discharging processes.• To focus on the need of fuel cells and the concept of their construction and functioning• To emphasize on the merits and demerits of each type of battery.	<ol style="list-style-type: none">1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells4. Choose a suitable battery or a fuel cell for a given application5. Evaluate different batteries or fuel cells in order to select a suitable battery or fuel cell for a given application

Unit-I: Batteries- Fundamentals

Types of cells: Reversible and Irreversible cells, Primary, Secondary and Reserve batteries.

Battery characteristics: Free energy change, Electromotive force of battery, Ampere-Hour, Capacity, Power, Power density, Energy density, Efficiency, Cycle life, Tolerance to service conditions, Performance characteristics.

Unit-II: Primary Batteries

Construction, electrochemistry and technology of Zinc-Air Battery, Nickel metal hydride battery,

Primary lithium batteries: **Soluble Cathode Cells, Solid Cathode Cells**-Lithium Manganese dioxide, Lithium-Vanadium Pentoxide battery, **Solid electrolyte cells**- Lithium polymer electrolyte Battery- Applications.

Unit-III: Secondary Batteries

Construction, electrochemistry and technology of Maintenance Free Lead Acid battery (MFLA), Valve Regulated Lead Acid battery (VRLA), Absorbed Glass Mat Lead Acid battery (AGMLA). Nickel-Cadmium battery, Reserve battery.

Secondary Lithium batteries: Liquid organic electrolyte cells, polymer electrolyte cells, lithium ion cells, applications.

Unit –IV: Fuel Cells

Introduction, classification based on temperature and nature of electrolyte. Working principle, components, applications and environmental aspects of Alkaline fuel cell (AFC)- Hydrogen-Oxygen alkaline fuel cell, Methyl alcohol - Oxygen alkaline fuel cell, Phosphoric acid fuel cell (PAFC), Molten carbonate fuel cell (MCFC), Polymer Electrolyte membrane Fuel cell (PEMFC), Solid oxide fuel cell (SOFC).

Suggested Reading

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
3. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
4. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning
2. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).
3. Dell R. M. and Rand D. A. J., "Understanding Batteries", Royal Society of Chemistry, UK, 2001.
4. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993

DEPARTMENT OF CHEMISTRY
SYLLABUS FOR B.E. V SEMESTER
CORROSION SCIENCE AND TECHNOLOGY (Open Elective-IV)

Instruction :2 Hours / Week	SEE Marks :70	Course Code : OE440CH
Credits : 2	CIE Marks :30	Duration of SEE : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the students :	At the end of the course students should be able to:
<ol style="list-style-type: none">1.To acquaint with the causes and factors influencing the rate of corrosion2.To understand the different types of corrosion like dry, wet and galvanic corrosion and their relative impact3.To familiarize with various preventive methods of corrosion such as cathodic protection, use of inhibitors, coatings, etc.4.To know various industrial methods like electroplating, electroless plating.	<ol style="list-style-type: none">1.Explain different types of corrosion with suitable examples2.Analyze the given case study and diagnose the type of corrosion in a given corrosion problem3.Discuss different factors that affect corrosion and passivation of metals4.Select a suitable metallic coating for corrosion control of the equipment in a given application5.Explain the mechanism by which organic coatings and inhibitors control corrosion of metals6.Discuss the principles and application of cathodic protection and surface conversion coatings for corrosion control

UNIT-I: Chemical and Electrochemical Corrosion

Introduction - gravity, **cause**, Chemical and Electrochemical corrosion, **Pilling – Bed worth** rule, effect of nature of oxide layer on rate of chemical corrosion, **Galvanic corrosion**, electrochemical series and galvanic series. Formation of anodic and cathodic areas, Differential aeration corrosion -pitting, water line **corrosion** & crevice corrosion, stress corrosion, corrosion fatigue. Passivation of metals, polarization curve of passivating metals, effect of pH and potential-pH diagram for iron (Pourbaix Diagram) and polarization curve of iron, application of Pourbaix diagram for corrosion mitigation.

Factors influencing corrosion

a. Nature of metal: Relative position of metal in galvanic series, Over voltage, Relative areas of anode & cathode and Nature of corrosion product.

b. Nature of environment: Temperature, pH and Humidity.

UNIT-II: Corrosion Control by Metallic Coatings

Metallic coatings: Types - anodic & cathodic. Pre treatment of surface of base metal. Methods of application of metallic coatings: Hot dipping-galvanization - applications of galvanized RCC steel bars. Cladding, Electroplating & Electroless plating- Principle and their differences.

Electroplating of Cu coating on Fe, Electroless plating of Ni coating on Insulators, Preparation of PCB using Electroless plating.

UNIT-III: Corrosion Control by Inhibitors and Organic Coatings

Corrosion Inhibitors: Anodic, Cathodic and Vapour phase inhibitors.

Organic Coatings: Paints – constituents and their functions. Vitreous enamel coatings. Varnishes. Super hydrophobic and self healing coatings. Epoxy coatings on RCC steel bars- Impervious coatings.

UNIT-IV: Corrosion Control by Cathodic Protection and Surface Conversion

Cathodic protection: Principle, Sacrificial Anodic Protection (SAP), Impressed Current Cathodic Protection (ICCP). Application of Cathodic protection for bridges, ship hulls and underground pipelines.

Surface conversion coatings: Carburizing, Nitriding, Cyaniding.

Suggested Reading:

1. P.C.Jain and Monica Jain, "Engineering Chemistry", Dhanpat Rai Pub, Co., New Delhi (2002)
2. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
3. Chemistry of Engineering Materials by R.P Mani and K.N.Mishra, CENGAGE learning
4. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).
5. Principles and prevention of corrosion: Denny A Jones, Prentice Hall, 1996.
6. Derek Pletcher and Frank C. Walsh, "Industrial Electrochemistry", Chapman and Hall, New York, 1993
7. Fundamentals of Corrosion: Michael Henthorne, Chemical Engineering
8. Corrosion Engineering: Mars G Fontana, Mc Graw Hill, 1987

Online resources:

1. www.nptel.ac.in
2. <http://ndl.iitkgp.ac.in>
3. <http://ocw.mit.edu>

DEPARTMENT OF HUMANITIES AND SOCIAL SCIENCES
SYLLABUS FOR B.E. V SEMESTER
TECHNICAL WRITING AND PROFESSIONAL PRESENTATIONS
(Open Elective-IV)

Instruction :2 Hours / week	SEE Marks :70	Course Code : OE510EH
Credits : 2	CIE Marks :30	Duration of SEE : 3 Hours

OBJECTIVES	OUTCOMES
The course will enable the student:	At the end of the course students should be able to:
<ul style="list-style-type: none">• This course introduces the principles and mechanics of technical writing for students of engineering.• specific communications skills associated with reporting technical information and will write a series of papers ranging from process description and feasibility reports to research projects, project proposals, and statement of purpose, which are pre-requisites for start-up companies and getting into foreign universities as well.• how to make effective presentations as part of today's workplace demands.	<ol style="list-style-type: none">1. write effective reports2. research and write project proposals and SOPs3. make persuasive presentations

UNIT I

A. TECHNICAL REPORTS- INFORMAL

Informal report formats, project and research reports

B. TECHNICAL REPORTS-FORMAL

Formal report components, feasibility reports, evaluation reports, Analytical and informational reports, executive summaries.

UNIT II

TECHNICAL WRITING IN BUSINESS CORRESPONDENCE

Components of a letter, forms of electronic communication, effective emails, instant and text messaging guidelines.

UNIT III

TECHNICAL RESUMES

Parts of a resume, letters of employment, resume format and distribution, cover letter writing, the curriculum vitae.

UNIT IV

a) PROFESSIONAL PRESENTATIONS

Personal presentations, Paper presentations, Poster presentations, Power point presentations

b) HOW TO WRITE PROPOSALS AND STATEMENT OF PURPOSE

Types of proposals, persuasive elements, requests for proposals, stating your objective

Learning Resources:-

1. Effective Technical Communication, M Ashraf Rizvi, Tata McGraw-Hill Education, 2005
2. Raman, Meenakshi & Sangeeta Sharma. Technical Communication: Principles and Practice. Second Edition. New Delhi: Oxford University Press, 2011.
3. Hacking Your Statement of Purpose: A Concise Guide to Writing Your SOP, Milena Young, 2014.
4. How to prepare a *feasibility study*: a step-by-step guide including 3 model *studies*. Front Cover. Robert E. Stevens, Philip K. Sherwood. Prentice-Hall, 1982.
5. Successful Presentations (with DVD): John Hughes & Andrew Mallett. Oxford university Press.

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING
SCHEME OF INSTRUCTION AND EXAMINATION FOR BE VI-SEMESTER w.e.f. 2018-19 under CBCS
(Students admitted in 2016-17)

S. No	Course Code	Course name	Scheme of Instruction				Scheme of Examination			Credits
			Periods per Week				Duration in Hrs	Max Marks		
			L	T	D	P		SEM	CIE	
THEORY										
1	PC610CS	Web Programming & Services	3	1	0	0	3	70	30	3
2	PC620CS	Software Engineering	3	0	0	0	3	70	30	3
3	PC630CS	Compiler Construction	3	0	0	0	3	70	30	3
4	PC640CS	Artificial Intelligence	3	1	0	0	3	70	30	3
5	PE6X0CS	Professional Elective-I	3	0	0	0	3	70	30	3
6	HS610EH	Finishing School-IV (Soft Skills)	1	1	0	0	1.5	35	15	1
7	MC610CS	Finishing School-IV (Technical Skills)	1	1	0	0	1.5	35	15	1
8	OE5XXXX	Open Elective-VI	1	0	0	0	2	50	30	1
9	OE5XXXX	Open Elective-VII	2	0	0	0	3	70	30	2
PRACTICALS										
1	PC611CS	Web Programming & Services Lab	0	0	0	2	3	50	25	1
2	PC621CS	Software Engineering Lab	0	0	0	2	3	50	25	1
3	PC631CS	Compiler Construction Lab	0	0	0	2	3	50	25	1
4	PW619CS	Mini Project	0	0	0	2	-	-	25	1
		Total	20	4	0	8	--	690	340	24
		Grand Total	32				1030			

Professional Elective - I	
PE610CS	Image Processing
PE620CS	Software Project Management
PE630CS	Wireless & Mobile Communications
PE640CS	Network security
PE650CS	Computer Graphics

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
WEB PROGRAMMING & SERVICES

Instruction: 3+1 Hrs /week	SEE Marks :70	Course Code : PC610CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">• Develop web applications using technologies like HTML, XML, JavaScript, Servlet, JSP & PHP• Develop and publish web services	<ol style="list-style-type: none">1. Design static web pages using HTML, CSS & Java Script2. Develop applications using JDBC API to connect to database3. Develop dynamic web applications using Servlets by applying MVC architecture4. Design web pages using JSP & PHP scripting languages with database connectivity5. Deploy web applications, publish web services on Azure cloud

UNIT-I

Web Basics and Overview: Evolution of the Internet and World Wide Web, Web Basics, Introduction to HTML5, HTML5 Validation Service, Forms, HTML5 Form input Types, Cascading Style Sheets (Part-1).
JavaScript: Introduction to Scripting Functions, Arrays, Objects.

UNIT-II

XML: XML Basics, XML Document Structure, XML Namespaces, XSL Transformations.

Working with JDBC 4.0: JDBC Drivers, JDBC Processes with java.sql package: Types of Statements, Retrieving Meta information from Database and ResultSet.

JDBC Processes with javax.sql package: JDBC Data Sources, Connection Pooling, Working with Transactions.

UNIT-III

JavaEE Platform: Enterprise Architecture Types, JavaEE7 Architecture, Microservice Architecture

Working with Servlet 3.1: Java Servlet API, Servlet Life Cycle, Servlet Implementation, Request and Response Scope.

Handling Sessions: Approaches to Session Tracking, Session Tracking with Java Servlet API.

UNIT-IV

JSP: Introduction to JSP, Architecture, JSP Lifecycle, JSP Elements: Directives, Scripting Elements, Action Tags, JSP Expression Language.

JSP Tag Extensions: Tag Extensions, Tag Extension API, Writing Tag Handlers.

PHP: Introduction, Conversion between Data Types, Arithmetic Operators, Manipulating Arrays, String Processing, Form Processing and Business Logic, Reading from Database, Using Cookies.

UNIT-V

Web Services: Web Services Technologies - SOAP, REST, JSON, Web Services Architecture, Publishing and Consuming SOAP-Based WCF Web Service, Publishing and Consuming REST-Based XML Web Service, Publishing and Consuming REST- Based JSON Web Service.

Serverless Computing: AWS services, AWS Lambda, Use-Cases, Web application Deployment in Azure, Docker Container.

Suggested Books:

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
2. Java Server Programming Java EE7 (J2EE 1.7): Black Book, (2014), Dreamtech Press.

Reference Books:

1. Uttam K. Roy, Web Technologies, (2012), Oxford Publishers.
2. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.

Online Resources:

1. <https://www.w3schools.com/html/>
2. <https://docs.oracle.com/javaee/7/tutorial/index.html>
3. <https://www.javatpoint.com/php-tutorial>
4. <https://docs.microsoft.com/en-us/aspnet/web-forms/index>
5. <https://aws.amazon.com/lambda/>
6. <https://www.docker.com/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
SOFTWARE ENGINEERING

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : PC620CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">• understand the concepts involved in the lifecycle of software development• learn the best practices to be employed for the design, development, testing and maintenance of a software project	<ol style="list-style-type: none">1. Explain the software development lifecycle models for a software system development.2. Build the prototype for software business case and estimate the cost for software project development.3. Analyze the behavioral and architectural models using UML for the designed object oriented system.4. Design the behavioral and architectural models using UML.5. Identify verification and validation methods in a software engineering project and implement testing methods at various phases of SDLC .

UNIT-I

Introduction to Software Engineering:

A generic view of Process: Software Engineering, Process Framework CMM Process Patterns, Process Assessment, Personal and Team Process Models.

Process Models: Prescriptive models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, The Unified Process.

An Agile view of Process: What is Agility, What is an Agile Process, Agile Process Models-Extreme programming, SCRUM-Framework, Roles, planning, Sprint, Kanban method, crystal, Dynamic Systems Development Method, Feature-Driven Development.

UNIT-II

Planning and Managing the project: Tracking progress, Project Personnel, Effort Estimation, Risk Management, The Project Plan, Process Models and project Management.

Requirements Engineering: A bridge to Design and Construction, Requirements Engineering Tasks, Initiating Requirements Engineering Process, Eliciting Requirements, Negotiating Requirements, Validating Requirements.

Design concepts and principles –Principles, Abstraction, Refinement, Modularity, Cohesion and Coupling.

UNIT-III

Object oriented Modeling & design using UML: Introduction to UML.

Structural Modeling: Classes and Advanced Classes, Relationships and Advanced Relationships, Common Mechanisms, Class Diagrams, Interfaces, Types and Roles, Packages.

UNIT-IV

Behavioural Modelling: Interactions, Interaction diagrams, Use Cases, Use Case Diagrams, Activity diagrams, Events and Signals, Processes and Threads, State Machines, State chart Diagrams.

Architectural Modelling: Artifacts, Development, Collaborations, Artifact diagrams, Deployment diagrams.

UNIT-V

Testing Strategies: A Strategic approach to software testing ,Strategic issues, Test strategies for O-O Software, Validation testing, System testing, the art of debugging.

Testing Tactics: Software testing fundamentals, Black box and White box testing, Basis path testing, Control Structure, O-O testing methods, Class level testing methods, Inter class test case design, Testing for specialized environments, architectures and Applications testing patterns.

Product Metrics: Software quality, A frame work for Product metrics , Metric for the analysis model, Metrics for the Design Model , Metrics for Source code, Metrics for testing, Metrics for maintenance

Suggested Books:

1. Roger S. Pressman, Software Engineering: A Practitioner's Approach, 6th Edition (2005), Tata McGrawHill.
2. Grady Booch, James Rumbagu, Ivor Jacobson, The Unified Modeling Language-User guide, (Covering UML 2.0) ,2nd Edition (2007), Pearson Education, India.

Reference Books:

1. Shari Lawrence Pfleeger, Software engineering Theory and Practices, 4th Edition (2011), Pearson Education, India.
2. Pankaj Jalote, An Integrated Approach to Software Engineering, 3rd Edition (2005), Narosa Publishing House.

Online Resources:

1. <http://nptel.ac.in/courses/106101061/>
2. <http://freevideolectures.com/Course/2318/Software-Engineering>
3. <http://www.ece.rutgers.edu/~marsic/books/SE/instructor/slides/>
4. <https://ocw.mit.edu/courses/aeronautics-and-astronautics/16-355j-software-engineering-concepts-fall-2005/lecture-notes/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
COMPILER CONSTRUCTION

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : PC630CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">Analyze various phases of compiler and design a compiler for a generic machineBuild efficient target code applying various code optimization techniques	<ol style="list-style-type: none">Compare different language Processors and design Lexical Analyzer for a given languageDesign Parser using top down and bottom up parsing techniquesGenerate Intermediate code for a given set of instructionsChoose a data structures for symbol table organization and dynamic memory managementApply code optimization techniques to generate efficient target code

UNIT-I

Introduction: Programs related to compilers, Translation process, Major data structures, Other issues in compiler structure, Boot strapping and porting.

Lexical analysis: The role of Lexical Analyzer, Input Buffering, Specification of Tokens. Recognition of Tokens, Error Recovery, The Lexical-Analyzer Generator LEX.

UNIT-II

Syntax Analysis : Introduction, Top-Down parsing-Recursive Descent, Predicative LL(1), Bottom-Up parsing- Introduction to LR Parsing, Powerful LR parsers SLR, CALR, LALR, , Using ambiguous grammars, Error recovery in top down and bottom up parsers ,Parser Generators -YACC.

UNIT-III

Syntax Directed Translation: Syntax Directed Definitions, Evaluation Orders for SDDs, Applications of Syntax Directed Translation.

Intermediate code generation: Variants of syntax trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking, Control Flow.

UNIT-IV

Storage Organization: Stack Allocation of Space, Access to Non local Data on the Stack. Heap Management, Introduction to Garbage Collection

Symbol Table Organization: Structure of Symbol table, Symbol Table organization for Block Structured and non block Structure languages, Data Structures of symbol Table.

UNIT-V

Code Generation: Issues in the Design of a Code Generator, The Target Language, Addresses in the Target Code Basic Blocks and Flow Graphs.

Code Optimization: Optimization of Basic Blocks. Simple code generator, Peephole Optimization, Register Allocation and Assignment, Optimal code generation for expressions, Dynamic Programming Code Generation ,Machine Independent Optimizations – The Principal Sources of Optimizations, Introduction to data flow analysis, Foundation of Data Flow Analysis, Constant propagation.

Suggested Books:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman ,Compilers: Principles, Techniques &Tools , 2nd Edition(2007), Pearson Education.
2. Keith d Cooper & Linda Tarezon, Engineering a Compiler, 2nd Edition(2011), Morgan Kafman.

Reference Books:

1. John R Levine, Tony Mason, Doug Brown Lex&Yacc, 3rd Edition(2007), Shroff Publisher .
2. Kenneth C Loudon , Compiler Construction: Principles and Practice, 2nd Edition(2005) ,Cengage Learning,
3. John R Levine ,Lex&Yacc, 2nd Edition(2009), Oreilly Publishers.

Online Resources:

1. <http://nptel.ac.in/courses/106108052/1>
2. <http://freevideolectures.com/Course/3051/Compiler-Design>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
ARTIFICIAL INTELLIGENCE

Instruction: 3+1 Hrs /week	SEE Marks :70	Course Code : PC640CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, Students will be able to
<ul style="list-style-type: none">Understand issues and techniques involved in the creation of intelligent systems	<ol style="list-style-type: none">Solve searching problems using A*Develop an algorithm for playing games. Represent the knowledge using propositional logicCreate logical agents to do inference using first order logic.Understand Bayesian Networks to do probabilistic reasoningBuild neural network and decision tree to solve classification problems

UNIT I

Introduction – Introduction to AI.

Intelligent Agents – Agents and Environments, Good Behavior: The Concept of Rationality, The Nature of Environments, The Structure of Agents.

Solving Problems By Search – Problem Solving Agents, Formulating problems, Searching for Solutions, Uninformed Search Strategies: Breadth-first search, Depth-first search, Depth limited search, Iterative deepening depth_first search, Informed (Heuristic) Search Strategies: Greedy best-first search, A* Search: Minimizing the total estimated solution cost, Heuristic Functions, Local Search Algorithms and Optimization Problems.

UNIT II

Adversarial Search – Games, The minimax algorithm, Optimal decisions in multiplayer games, Alpha-Beta Pruning, Evaluation functions, Cutting off search.

Logical Agents – Knowledge-Based agents, The Wumpus World, Logic, Propositional Logic: A Very Simple Logic, Reasoning Patterns in Propositional Logic: Resolution, Forward and Backward chaining.

UNIT III

First Order Logic – Syntax and Semantics of First-Order Logic, Using First-Order Logic , Knowledge Engineering in First-Order Logic.

Inference In First Order Logic – Propositional vs. First-Order Inference, Unification and Lifting, Forward Chaining, Backward Chaining, Resolution .

UNIT IV

Uncertainty – Acting under Uncertainty, Basic Probability Notation, The Axioms of Probability, Inference Using Full Joint Distributions, Independence, Bayes' Rule and its Use.

Probabilistic Reasoning – Representing Knowledge in an Uncertain Domain, The Semantics of Bayesian Networks, Efficient Representation of Conditional Distribution, Exact Inference in Bayesian Networks, Approximate Inference in Bayesian Networks.

UNIT V

Learning from Observations: Learning decision-trees using Information theory, Learning General Logical Descriptions.

Neural Networks: Perceptron, Multilayer feed-forward neural network.

Suggested Books:

1. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2015), Pearson
2. Nils J. Nilsson, Artificial Intelligence: A New Synthesis, (1998), Elsevier

Reference Books:

1. Daniela Witten, Gareth James, Robert Tibshirani, and Trevor Hastie, An Introduction to Statistical Learning with Applications in R (Springer Texts in Statistics)
2. Stuart Russell, Peter Norvig, Artificial Intelligence – A Modern Approach, Third Edition (2015), Pearson
3. George F Luger , Artificial Intelligence, Structures and strategies for Complex Problem Solving, Sixth Edition,(2009), Pearson
4. Elaine Rich, Kevin Knight, Shivashankar B Nair, Artificial Intelligence, Third Edition(2009), Tata McGraw Hill

Online Resources :

1. <http://www.nptel.ac.in/courses/106105077>
2. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-spring-2005>
3. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-034-artificial-intelligence-fall-2010/lecture-videos>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
IMAGE PROCESSING

Instruction: 3 Hrs /week	SEE Marks :70	Course Code : PE610CS
Credits : 3	CIE Marks: 30	Duration of SEE : 3 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">• Understand the fundamentals of image processing algorithms.• Implement and gain experience in applying image processing algorithms to real problems.	<ol style="list-style-type: none">1. Distinguish sampling and quantization processes in obtaining digital images from continuously sensed data and describe the steps in image processing.2. Apply Fourier transformation and other transformation techniques to enhance digital image.3. Apply techniques in spatial domain to enhance and segment digital images.4. Describe methods to encode raw image data into standard compressed image format.5. Demonstrate most commonly applied image restoration and color models and their use in basic image processing.

UNIT-I

Introduction to Digital Image Processing, Origins and Applications of Digital Image Processing. Fundamental Steps in Digital Image Processing, Components of Digital Image Processing System. Elements of Visual Perception, Light and the Electromagnetic Spectrum, Image Sensing and Acquisition, Image Sampling and Quantization.

UNIT-II

Filtering in the Frequency Domain: Preliminary Concepts, Sampling and the Fourier Transform of Sampled Functions, The Discrete Fourier Transform (DFT) of One Variable, Extension to Function of Two Variables, , Image Smoothing and Sharpening using Frequency Domain Filters.

UNIT-III

Intensity Transformations and Spatial Filtering: Histogram Processing, Fundamental of Spatial Filtering, Smoothing and Sharpening Spatial Filters. **Image Segmentation:** Point, Line and Edge Detection, Thresholding, Region-Based Segmentation.

UNIT-IV

Image Compression: Fidelity Criteria, Image Compression Models, Image Formats, Containers and Compression Standards, Compression Methods: Huffman Coding, Golomb Coding, Arithmetic Coding, LZW Coding, Run-Length Coding.

UNIT-V

Restoration: Noise Models, Inverse filtering, Least squares Filtering.

Color Image Processing : Color fundamentals, color models, Pseudocolor Image Processing, Basics of full color image processing.

Suggested Books:

1. Gonzalez R.C., Woods R.E, Digital Image Processing, Third Edition (2007), Prentice Hall, USA.
2. Jayaraman S, Esakkirajan S, Veerakumar T, Digital image processing, 13th reprint (2014), McGraw Hill Education, New Delhi.

Reference Books:

1. William K. Pratt, Digital Image Processing, 3rd Edition (2001) , John Wiley & Sons Inc, UK.
2. McAndrew, Introduction to Digital Image Processing, (2004), Cengage Learning.
3. Sonka, Hlavac, Boyle, Digital Image Processing and Computer Vision, (2008), Cengage Learning.
4. Rosenfeld A. Kak AC, Digital Picture Processing Vol.I & II Acad, Press, 2nd Edition.

Online Resources:

1. <https://ocw.mit.edu/resources/res-6-008-digital-signal-processing-spring-2011/introduction/>.
2. <http://freevideolectures.com/Course/2316/Digital-Image-Processing-IIT-Kharagpur>.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E.- VI SEMESTER
FINISHING SCHOOL – IV : SOFT SKILLS

Instruction: 1+1 Hrs /week	SEE Marks :35	Course Code : HS610EH
Credits : 1	CIE Marks: 15	Duration of SEE : 1.5 Hrs

Course Objectives	Course Outcomes
<ol style="list-style-type: none">1. This course aims at enhancing the employability skills. Students will be trained in higher order thinking skills including analytical skills, problem solving skills and critical & logical reasoning skills. Students will be trained to work systematically and develop logical and analytical thinking.2. Students will be trained in the following areas<ol style="list-style-type: none">1. Critical and Non-verbal reasoning2. Pure Maths3. Verbal ability4. Logical reasoning5. Data Interpretation and Analysis	<p>At the end of the course, students will be able to:</p> <ol style="list-style-type: none">1. Understand the fundamentals concepts of Aptitude and verbal skills2. Solve questions using short cuts and smart methods3. Perform calculations with speed and accuracy4. Develop Analytical thinking and problem solving skills

UNIT I: VERBAL ABILITY

- Finding errors
- Vocabulary
- Synonyms
- Antonyms
- Idioms and Phrases
- Fill in the blanks and sentence Jumbles
- Reading comprehension

UNIT II : LOGICAL REASONING

- Logical Reasoning
- Assignments

- Puzzles
- Blood relations
- Syllogisms

UNIT III : CRITICAL AND NON VERBAL REASONING

- Critical Reasoning
- Nonverbal reasoning
- Figure series and completions

UNIT IV : QUANTITATIVE APTITUDE - PURE MATHS

- Pure maths
- Algebra
- Probability
- Permutations and combinations

UNIT V: DATA INTERPRETATION AND ANALYSIS

- Data Interpretation
- Line graph
- Pie chart
- Bar Graph
- Tabulations

With effect from the A.Y 2018-19

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
PEGA – TECH COURSE- I
FINISHING SCHOOL –IV (TECHNICAL SKILLS)

Instruction: 2 Hrs /week	SEE Marks :35	Course Code : MC650CS
Credits : 1	CIE Marks: 15	Duration of SEE : 1.5 Hrs

Course objective	Course outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none"> • Discuss general DCM (Dynamic Case Management) and BPM industry definitions, technologies and methodologies and how the implementation strategies and artifacts are used within the Pega software development environment. 	<ol style="list-style-type: none"> 1. Describe how Agile and Scrum are the core methodologies utilized by Pega 7 with its DCO process for requirements elicitation 2. Apply Pega flows and decision artifacts to implement application processes 3. Implement web-based UI technologies through Pega UI rules 4. Explain how Pega database(s) and tables support application persistency of class instance data

UNIT-I

Prerequisite Technologies and DCO: Comparative Analysis Industry components/Pega Artifacts, DCO Concepts, Pega’s Business Application Platform ,Prototyping an Application with Pega Express, Case Design using Designer Studio.

UNIT-II

Pega Business Architect: Application Analysis, Application Design and Collaboration.

Application Design, Case Design, Data Model Design, Process Design, Decision Design, UI Design, Report Design, Data Management, Application Debugging.

Online Resources:

1. <https://pdn.com/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
SALESFORCE
FINISHING SCHOOL –IV (TECHNICAL SKILLS)

Instruction: 2 Hrs /week	SEE Marks :35	Course Code : MC651CS
Credits : 1	CIE Marks: 15	Duration of SEE : 1.5 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">• Build data objects & programmatically retrieve, manipulate and store the data associated with those objects.• Write custom logic using Apex triggers and classes, and test that logic using the built-in testing framework.	<ol style="list-style-type: none">1. Design and manage the correct data model based on business requirements.2. Customize applications for mobile use and Lightning.3. Design programmatic solutions that take advantage of declarative customizations4. Apply built-in testing framework to test Apex and Visualforces

UNIT-I

Building Your Data Model Declaratively, Crafting User Interface, Constructing Business Logic, Maintaining Record and Data Security, Automating Business Processes, Deploying App, Designing Advanced User Interface Components, Deciding When Declarative Isn't Enough.

UNIT-II

Objects and Fields, Work Effectively with Custom Objects and Fields, Programming with Apex, Use SOQL to Query Your Org's Data, Use SOQL to Query Parent-Child Relationships, DML Essentials, Trigger Essentials, Classes, The Save Order of Execution and Apex Transactions, Testing Essentials, Testing Strategies

Online Resources:

1. <https://trailhead.salesforce.com/>

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DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
SAP - ABAP
FINISHING SCHOOL –IV (TECHNICAL SKILLS)

Instruction: 2 Hrs /week	SEE Marks :35	Course Code : MC652CS
Credits : 1	CIE Marks: 15	Duration of SEE : 1.5 Hrs

Course objective	Course outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">Apply ABAP language and develop ABAP-based business applications.	<ol style="list-style-type: none">Process user request in AS ABAPAnalyze transparent tables in the data dictionaryImplement selection screensApply object oriented programming model to design componentsApply classic enhancements to elements

UNIT-I

SAP Systems, Portfolio, Navigation Basics, SAP UI, System Core, Communication and integration technologies, flow of ABAP programme, ABAP Workbench, Language elements, Modularization techniques, Complex Data Objects, Data Modeling, Reports, Programme Calls and Memory Management, Open SQL, ABAP Dictionary, Data Types, Database Tables, Object Dependencies, Views, Search helps, Screen Programming, Tabstrip Controls

UNIT-II

Introduction to object oriented programming, Inheritance, Interfaces, Events, Repository Objects, ABAP Object Oriented Examples, Exceptions, Design Patterns, Dynamic Programming, Adjustment of SAP standard software, Enhancement of Dictionary elements, Customer Exits, Business Add-ins, Enhancement Options, Modifications of SAP standard applications, Web Dynpro, Controllers, Context, UI and Context Programming

Online Resources:

- <https://www.sap.com/india/developer/topics/abap-platform.html>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E. VI SEMESTER
WEB PROGRAMMING & SERVICES LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code : PC611CS
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hrs

Course objectives	Course outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">• Develop web applications• Publish web services	<ol style="list-style-type: none">1. Create a website using HTML, CSS, XML & JavaScript2. Develop dynamic web applications using Servlets3. Develop dynamic web applications using JSP's, PHP with DB connectivity4. Develop dynamic web applications using ASP.Net with DB connectivity5. Create and publish Web Services

LIST OF EXPERIMENTS

1. Creation of Static Web Site using HTML
2. Creation of Static Web Site using HTML Forms
3. Apply CSS to the Static Web Site
4. Validation of Static Web Site using Java Script
5. Demonstration of XML, XSLT
6. Providing data store support using JDBC
7. Creation of dynamic content in a Web Site using Servlets
8. Demonstration of Servlet Collaboration in Web Applications
9. Demonstrate Session handling in Web Applications using Cookies
10. Demonstrate Session handling in Web Applications using HttpSession
11. Creation of dynamic content in a Web Application using JSP
12. Creation of dynamic content in a Web Application using PHP
13. Publishing and Consuming a Web Service using SOAP
14. Publishing and Consuming a Web Service using REST
15. Demonstration of using AJAX in Web Application
16. Develop a web application and deploy in the cloud
17. Case Study

Suggested Books:

1. Paul J. Deitel, Harvey M. Deitel, Abbey Deitel, Internet & World Wide Web How to Program, 5th Edition, Pearson Education.
2. Java Server Programming Java EE7 (J2EE 1.7): Black Book, (2014), Dreamtech Press.

Reference Books:

1. Uttam K. Roy, Web Technologies, Oxford Publishers.
2. Robert W. Sebesta, Programming the World Wide Web, 7th Edition (2014), Pearson Education.

Online Resources:

1. <https://www.w3schools.com/html/>
2. <https://docs.oracle.com/javaee/7/tutorial/index.html>
3. <https://spring.io/docs>
4. <https://azure.microsoft.com/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR BE VI SEMESTER
SOFTWARE ENGINEERING LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code : PC621CS
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">Apply software engineering principles for analyzing, visualizing, specifying, constructing for software intensive system.Document the artifacts of software system.	<ol style="list-style-type: none">Identify the functional and non functional requirements and estimate effort /cost for the given system.Design the Data/Work/Control flow in the modules of the intended system.Construct the Structural, Behavioural, Interaction & State aspects for the intended system.Develop the artifacts of the intended system through forward and reverse engineering.Build test cases and evaluate the software project quality.

Select one large information system/Approach and device the following using CASE TOOL.

- Systems software Requirements and related analysis documents as per the guidance in ANSI/IEEE Std 830-1984.
- Design documents representing the complete design of the software system using Data flow diagram.
- Functional Decomposition and structure.
- Behavioral Modeling- use case diagram demonstration using UML.
- Behavioral Modeling- Interaction diagram demonstration using UML.
- Behavioral Modeling- State machine diagram demonstration using UML.
- Structural Modeling- Class diagram demonstration using UML.
- Familiarization of Forward and reverse engineering the class diagram using tools.
- Architectural Modeling-component and deployment diagram demonstration using UML.
- Simple exercises on effort, cost and resource estimation.

11. Familiarization of SCM tools with some public domain software like SCCS, CVS.
12. Test Generation, Verification.
13. Demonstration on functional testing using RFT.
14. Evaluation of project quality using RQM.
15. Build a model for a given application.

Suggested Books:

1. Roger S. Pressman, *Software Engineering: A Practitioner's Approach*, 6th Edition, (2005) Tata McGrawHill.
2. Grady Booch, James Rumbagu, Ivor Jacobson, *The Unified Modeling Language-User guide* , 2nd Edition, (2007), Pearson Education, India.

Reference Books:

1. James Rumbagu, Ivor Jacobson, Grady Booch, *The Unified Modeling Language-Reference Manual*, (2004), 2nd Edition, Pearson Education, India.

Online Resources:

1. http://www.nyu.edu/classes/jcf/g22.2440-001_sp09/handouts/UMLBasics.pdf
2. <https://courses.cs.washington.edu/courses/cse403/11sp/lectures/lecture08-uml1.pdf>
3. <http://www.conceptdraw.com/examples/online-uml-class-diagram-of-material-management-system>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
COMPILER CONSTRUCTION LAB

Instruction: 2 Hrs /week	SEE Marks :50	Course Code : PC631CS
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">• Implement phases of a compiler using YACC, LEX tools• Apply Various code optimization techniques to develop efficient target code	<ol style="list-style-type: none">1. Implement lexical analyzer2. Develop first and follow set for a given grammar3. Design top down and bottom up parsers4. Implement intermediate code generator5. Implement code optimization techniques

List of Programs

1. Scanner programs using C
2. Scanner programs using LEX
3. Find first set and follow set
4. Implementation of Recursive decent parser
5. Implementation of LL(1) parser.
6. Implementation of SLR parser.
7. Implementation of CLR parser.
8. Implementation of LALR Parser using ANTLR
9. Construct dependency graph for the given SDD
10. Intermediate Code generation using YACC
11. Construct the DAG for given three address code
12. Build a Tiny compiler for the C language using LEX and YAAC

Suggested Books:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman ,Compilers: Principles, Techniques &Tools , 2nd Edition(2007), Pearson Education.
2. Keith d Cooper & Linda Tarezon, Engineering a Compiler, 2nd Edition(2011), Morgan Kaufman.

Reference Books:

1. John R Levine, Tony Mason, Doug Brown Lex&Yacc, 3rd Edition(2007), Shroff Publisher .
2. Kenneth C Loudon , Compiler Construction: Principles and Practice, 2nd Edition(2005) ,Cengage Learning,
3. John R Levine ,Lex&Yacc, 2nd Edition(2009), Oreilly Publishers.

Online Resources

1. <http://nptel.ac.in/courses/106108052/1>
2. <http://freevideolectures.com/Course/3051/Compiler-Design>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
MINI PROJECT

Instruction: 2 Hrs /week	SEE Marks :-	Course Code : PW619CS
Credits : 1	CIE Marks: 25	Duration of SEE : -

Course objectives	Course outcomes
Students should be able to	At the end of the course students will be able to
<ul style="list-style-type: none">• Develop an application in the relevant area of Computer Science• Learn contemporary technologies	<ol style="list-style-type: none">1. Conduct literature survey to identify the problem2. Design a model to address the proposed problem3. Develop and test the solution4. Demonstrate the work done in the project through presentation and documentation5. Adapt to contemporary technologies

The students are required to carry out mini projects in any areas such as Data Communications, Web Programming & Services, Computer Networks, Compiler Construction and Object Oriented System Development.

Students are required to submit a report on the mini project at the end of the semester.

**OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E- VI SEMESTER (2018-19) Engineering Branches**

Dept.	Title	Code	credits
Open Elective VI (Semester - VI)			
Civil	Intelligent Transportation System	OE610CE	1
CSE	Introduction to Operating Systems	OE610CS	1
ECE	Consumer Electronics	OE610EC	1
EEE	Solar Power and Applications	OE610EE	1
IT	Introduction to Web Technologies	OE610IT	1
Mech.	Basics of Mechatronics	OE600ME	1
Open Elective VII (Semester - VI)			
Civil	Integrated Solid Waste Management	OE620CE	2
CSE	Introduction to Databases	OE620CS	2
ECE	Electronics for Automotive Applications	OE620EC	2
EEE	Programming For Engineers	OE620EE	2
IT	Statistical Programming using R	OE620IT	2
Mech.	Optimization Methods for Engineers	OE610ME	2
	Advances in Entrepreneurship	OE620ME	2

**DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. VI SEMESTER**

INTELLIGENT TRANSPORTATION SYSTEMS (OPEN ELECTIVE – VI)

Instruction: 1 hr/ Week	SEE marks:50	Course Code : OE610CE
Credits: 1	CIE marks:30	Duration of SEE : 2 hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>Objectives of this course are to:</i>	<i>Upon the completion of this course the students will be expected to:</i>
1. Impart knowledge on advanced transportation concepts in the field of ITS. 2. Introduce the technologies of ITS in solving transportation problems	1. Explain the concepts of ITS data collection techniques and its architectural framework. 2. Characterize ITS functional areas for transportation planning. 3. Describe the range of technologies involved in the delivery of ITS systems 4. Investigate and analyse the current applications and trends in the context of ITS 5. Present practical examples of ITS

UNIT I:

Introduction to Intelligent Transportation Systems (ITS): Definition of ITS and Identification of ITS Objectives, Historical Background, Benefits of ITS - ITS Data collection techniques – Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Geographic Information Systems (GIS), video data collection, ITS architecture framework.

UNIT II:

ITS functional areas – Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Commercial Vehicle Operations (CVO), Advanced Vehicle Control Systems (AVCS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS)

Suggested Books:

1. ITS Hand Book 2000: Recommendations for World Road Association (PIARC) by Kan Paul Chen, John Miles.
2. Sussman, J. M., Perspective on ITS, Artech House Publishers, 2005.

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR BE VI-SEMESTER
INTEGRATED SOLID WASTE MANAGEMENT (Open Elective – VII)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code : OE620CE
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

COURSE OBJECTIVES	COURSE OUTCOMES
<i>The objectives of the course are to</i>	<i>Upon the completion of the course, students are expected to</i>
1. Integrate technical solid waste management options and imposed environmental legislation for the guidance to the safe solutions.	1. Assess the implications of production, characteristic and environmental impact of Solid Waste Management based on its sources. 2. Assess the components of Biomedical and Radioactive wastes. 3. Narrate the management methods based on standards. 4. Outline the phases of generation to disposal of E-waste with the global strategic terms of Recycling

UNIT-I

Solid Waste and their Handling: Definition of solid wastes — types of solid wastes — Sources – Industrial, mining, agricultural and domestic — Characteristics. Solid waste Problems – impact on environmental health

UNIT-II

Biomedical Waste Management: Classification, collection, segregation Treatment and disposal.

UNIT-III

Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

UNIT-IV

E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

Learning Resources:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
3. Management of Solid waste in developing countries by Frank Flintoff, WHO regional publications 1976.
4. <http://nptel.ac.in/courses/>

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR B.E VI SEMESTER
INTRODUCTION TO OPERATING SYSTEMS (Open Elective-VI)
(for other Departments)

Instruction: 1 Hr /week	SEE Marks :50	Course Code :OE610CS
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course objective	Course outcomes
At the end of the Course students should be able to:	At the end of the Course students will be able to:
<ul style="list-style-type: none">Understand different Operating system Structures, Services and threading models	<ol style="list-style-type: none">Differentiate Operating system structures to show the evaluation of an operating systemAnalyze the role of an Operating system in executing tasks on a systemDistinguish single threaded and multi threaded models of executionCompare CPU scheduling algorithms to find effective algorithm for a given instance of process

UNIT-I

Introduction to operating systems: Definition, Mainframe, Multiprocessor, Clustered and Real time systems, Distributed, OS System structure, Unikernel, OS Services, Virtual machines, Containers, System calls.

UNIT-II

Process: Process concept, Process Scheduling, Inter-process communication, Threads, Multithreading Models.

CPU Scheduling: Scheduling Criteria, Scheduling Algorithms, Multiprocessor scheduling.

Suggested Books:

- Abraham Silberschatz, Peter B. Galvin, Greg Gagne, Operating System Concepts, 9th Edition (2016), Wiley India.

Reference Books:

- Andrew S. Tanenbaum, Modern Operating Systems, 2nd Edition (2001), Pearson Education, Asia.
- Dhananjay, Dhamdhere.M, Operating System-concept based approach, 3rd edition (2009), Tata McGraw Hill, Asia

3. Robert Love, Linux Kernel Development, (2004)Pearson Education
4. Richard Stevens, Stephen Rago, Advanced Programming in the UNIX Environment, 3rd Edition (2013), Pearson Education

Online Resources:

1. <https://ocw.mit.edu/courses/electrical-engineering-and-computer-science/6-828-operating-system-engineering-fall-2012/>

With effect from the A.Y 2018-19

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING
SYLLABUS FOR BE VI SEMESTER
INTRODUCTION TO DATABASES (Open Elective-VII)
(for other Departments)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code : OE620CS
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
Students should be able to	At the end of the course, students will be able to
<ul style="list-style-type: none">Identify different issues involved in the design and implementation of a database system.Understand transaction processing.	<ol style="list-style-type: none">Identify the functional components of database management system. Create conceptual data model using Entity Relationship DiagramTransform a conceptual data model into a relational modelDesign database using normalization techniquesApply indexing and hashing techniques for effective data retrieval

UNIT-I

Introduction: Database System Application, Purpose of Database Systems, View of Data, Database Languages, Relational Database, Database Architecture, Database Users and Administrators.

Database Design and E-R Model: Overview of the Design Process, the E-R Model, Constraints, E-R Diagrams.

UNIT-II

Relational Model: Structure of Relation Database, Relational Algebra Operations, Modification of the Database.

Structured Query Language: Introduction, Basic Structure of SQL Queries, Set Operations, Aggregate Functions, Null Values, Nested Sub queries, Views, Join Expressions.

UNIT-III

Relational Database Design: Features of Good Relational Designs, Atomic Domains and first Normal form, Decomposition Using Functional Dependencies, Functional Dependency Theory.

Department of Computer Science and Engineering

UNIT-IV

Indexing and Hashing: Basic Concepts, Ordered Indices, B+ Tree Index Files, B-Tree Files, Multiple – Key Access, Static Hashing, Dynamic Hashing.

Transaction Management: Transaction concept, Storage Structure, Transaction Atomicity and Durability, Transaction Isolation and Atomicity, Serializability, Recoverability.

Suggested books:

1. Abraham Silberschatz, Henry F Korth, Sudharshan S, Database System Concepts, 6th Edition(2011), McGraw-Hill International Edition.

Reference Books:

1. Date CJ, Kannan A, Swamynathan S, An Introduction to Database System , 8th Edition(2006) Pearson Education.
2. Raghu Ramakrishna, and Johannes Gehrke, Database Management Systems, 3rd Edition(2003), McGraw Hill.
3. RamezElmasri, Durvasul VLN Somyazulu, Shamkant B Navathe, Shyam K Gupta, Fundamentals of Database Systems, 4th Edition(2006), Pearson Education.
4. Peter rob, Carlos coronel, Database Systems, (2007), Thomoson.

Online resources:

1. <http://nptel.ac.in/courses/106106093/>

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
SYLLABUS FOR B.E. VI-SEMESTER
CONSUMER ELECTRONICS (Open Elective -VI)
(for other Departments)

Instruction: 1 Hrs /week	SEE Marks : 50	Course Code : OE610EC
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objective	Course Outcomes
1. Upon completion of the subject, the student shall know the basics of Electronics, operations of various Audio & Video Systems, Office & Home appliances and advance consumer electronic gadgets used in our day-to-day actives.	At the end of the course, students will be able to: <ol style="list-style-type: none">1. List technical specification of electronics Audio / Video systems.2. Understand the working of microphones and speakers and their application in Audio systems.3. Understand the basic functions of consumer electronic goods like cell phones, ATMs.4. Troubleshoot consumer electronic products like TV, Washing machine and AC.

UNIT - I

Brief history and development of Electronics – Basic Electronic Components - DC & AC –Sources, Kirchoff's Laws, ADCs, Frequency spectra - Ranges (Audio, Video, RF UHF, VHF, Microwave), Audio System - working principles, components - Microphones and Speakers, Principles of Video Processing and Displays (LCD, LED displays), Analog and Digital Video standards.

UNIT - II

Telecommunication Systems: Basics of Telephone system, Caller ID Telephone, Intercoms, Cordless Telephones, Cellular mobile systems, Basics of satellite communication.

Office Electronics: Automatic Teller Machines, Facsimile machines, Digital Diaries, Safety and security systems.

Home Electronics: Digital Camera system, Microwave ovens, Washing Machines, Air Conditioners and Refrigerators, Troubleshooting.

Suggested Reading:

1. Mitchel Schultz 'Grob's Basic Electronics', Mc Graw Hill Publishers, 12/e, 2016.
2. A.M. Dhake 'Television and Video Engineering', McGraw Hill Education, 2/e, 2014.
3. B.R. Gupta and V. Singhal, "Consumer Electronics", S.K. Kataria& Sons, 2013.
4. R.R.Gulati. 'Monochrome and Color Television' New Age International Publisher, 2/e, 2010.
5. S.P. Bali, 'Consumer Electronics', Pearson Education, 2008.

With effect from the A.Y 2018-19

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING
SYLLABUS FOR B.E. VI-SEMESTER
ELECTRONICS FOR AUTOMOTIVE APPLICATIONS
(Open Elective-VII)
(for other Departments)

Instruction: 2 Hrs /week	SEE Marks : 70	Course Code : OE620EC
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
<ol style="list-style-type: none">1. The student shall know the basics of Electronics for Automotive Applications, operation of various electronics modules2. The student shall know the various transducers and sensors used in automotive environment3. The student shall acquire good knowledge about various electronic modules	<p>At the end of the course, students will be able to:</p> <ol style="list-style-type: none">1. Appreciate the operation of various electronic modules, their functionality2. Understand various functions of modules like EBD, ABS, cruise control etc3. Understand the Advanced Driver Monitoring Systems (ADMS) and safety sensors in automotive environment4. Appreciate the advances in automotive electronic systems like driverless cars, collision avoidance systems etc.

UNIT – I

Introduction to sensors and transducers: displacement, position, proximity, acceleration, velocity, motion, rotation, force, fluid pressure, liquid flow, liquid level, temperature, light, smoke, and gas sensors. Selection of sensor.

UNIT – II

Data acquisition and Signal conditioning: various signal conditioning modules. Use of data acquisition. Fundamentals of Analog to digital conversion, sampling, amplifying, filtering, noise reduction. Criteria to choose suitable data acquisition equipment.

UNIT – III

Introduction to systems: Measurement and control. Basic system models. Mathematical models. Mechanical system building blocks, Electrical system building blocks, Fluid system building blocks and Thermal system building blocks. Engineering systems: Rotational – translational, Electromechanical, hydraulic-mechanical.

UNIT – IV

Engine management systems – Various sensors used in system – Electronic transmission control vehicle safety system – Electronic control of braking and traction.

Body electronics – Infotainment systems – Navigation systems – Application of Control elements and control methodology in automotive System.

Suggested Reading:

1. Tom Denton "Automobile Electrical and Electronic Systems" 5/e, Routledge, 2017.
2. De Silva, " Mechatronics", First Indian Reprint, (Taylor & Francis), Yesdee Publications, 2013.
3. William B. Ribbens, "Understanding Automotive Electronics: An Engineering Perspective" 7/e, Butterworth-Heinemann, 2012.
4. W. Bolton, "Mechatronics: Electronic control systems in mechanical and electrical Engineering", 3/e, Pearson Education, 2008.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SYLLABUS OF B.E VI- SEMESTER
SOLAR POWER AND APPLICATIONS (Open Elective – VI)

Instruction: 1 Hr /week	SEE Marks :50	Course Code :OE610EE
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course objective:	Course Outcomes:
To impart the basics of solar energy harnessing and solar panel and array.	A student will be able to <ol style="list-style-type: none">1. Identify and choose proper type of meter for solar radiation measurement.2. Use proper solar PV system according to the load requirements.3. Categorize and compare photovoltaic cells.4. Apply the knowledge of solar energy.

Unit – I

Solar Energy Basics: Sun as a source of energy, the Earth, Radiation Spectrums, Extraterrestrial and Terrestrial Radiations, Depletion of solar Radiation, Pyranometer, Pyrheliometer, Sunshine Recorder, Solar Collectors, Solar Water Heater, Solar Cookers and Solar Thermo-Mechanical Systems.

Unit – II

Solar Photovoltaic Systems: Solar Cell fundamentals, Cell characteristics, Cell classification, Module, Panel and Array, Maximizing the Solar PV output and load matching, MPPT, Stand-Alone Solar PV system, Grid-Interactive Solar PV system, Water Pumping and lighting.

Suggested Reading:

1. B H Khan, Non-Conventional Energy Resources, 2nd Edition, Tata McGraw Hill.
2. G. D. Rai, Non-Conventional Energy Sources, 13th Reprint 2014, Khanna Publications.

Online Resource:

1. <https://drive.google.com/file/d/>
2. www.pdfdrive.net
3. www.edx.org

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING
SYLLABUS OF B.E VI- SEMESTER
PROGRAMMING FOR ENGINEERS (Open Elective – VII)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code : OE620EE
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course objective:	Course Outcomes:
To provide fundamental knowledge of programming language for solving problems.	A student will be able to 1. Use arrays and matrices for numerical problems solving. 2. Represent data and solution in graphical display. 3. Create easily programmable graphical user interface. 4. Write scripts and functions to easily execute series of tasks in problem solving.

Unit – I

Working with matrices and arrays:

Generating matrices, load functions, M-files, Concatenation, deleting rows and columns, linear algebra, arrays, multivariate data, scalar expansion and logic scripting.

Unit – II

MATLAB Plotting:

Plotting process, graph components, figure tools, arranging graphs, select plot types, editing plots and basic plotting functions.

Unit – III

Graphics:

Printing Graphics, Handle Graphics and animations.

Creating GUI:

Layout of GUI and programming a GUI.

Unit – IV

Programming:

Flow control, other data structures, scripts and functions.

Suggested Reading :

1. Getting started with MATLAB (Version 7) The Math works.
2. Getting started with MATLAB "A quick introduction for scientist and engineers by RudraPratap, Oxford publications.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS OF B.E VI- SEMESTER
INTRODUCTION TO WEB TECHNOLOGIES (Open Elective-VI)

Instruction: 1 Hrs /week	SEE Marks :50	Course Code :OE610IT
Credits : 1	CIE Marks: 30	Duration of SEE : 2 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
Acquire basic skills for designing static and dynamic Web Applications using HTML, CSS and Javascript.	<ol style="list-style-type: none">1. Develop and publish Web pages using Hypertext Markup Language .2. Optimize page styles and layout with Cascading Style Sheets.3. Make use of concepts in Java script for creating a dynamic web applications.4. Implement event handlers to respond to various events.

UNIT-I:

Introduction: World Wide Web, Web Browsers, Web Servers, URL, HTTP. HTML: Standard HTML document structure, Basic Tags, Images, Hypertext Links, Lists, Tables, Frames. CSS: In-line style sheets, Internal Style sheets and External Style sheets.

UNIT-II

JavaScript: Introduction, Basics of java script-variables, data types and operators, Control Structures, Arrays, Functions, HTML Forms, Events and event handling.

Learning Resources:

1. "Web Technologies", 7th Edition, Uttam K.Roy,2012.
2. "Internet & World Wide Web How to Program", 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS OF B.E VI- SEMESTER
STATISTICAL PROGRAMMING USING R (Open Elective-VII)

Instruction: 2 Hrs /week	SEE Marks :70	Course Code :OE620IT
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hrs

Course Objectives	Course Outcomes
The course will enable the students to:	At the end of the course student will be able to:
The course will enable the students to apply the R programming language in the analysis of Statistical data.	<ol style="list-style-type: none">1. Write simple programs in R language to manipulate and visualize the data.2. Write complex program using different constructs of R language to solve simple problems.3. Use R programming language in the simulation of different types of random variables.4. Write programs using R language in the analysis and computation of different matrix operations.

Unit I: Introduction to R Language

Basic features of R, Built-in functions, logical vectors and relational operators, Data input and output, programming statistical graphs- High-level plots, low level graphic functions.

Unit II: Programming with R

Flow control, Managing complexity through functions, Miscellaneous programming tips, Debugging and maintenance, Efficient programming.

Unit III: Simulation

Montecarlo simulation, Generation of pseudo random numbers, Simulation of other random variables-Bernouli, Binomial, Poisson, Exponential and Normal random variables.

Unit IV: Computational Linear Algebra

Vectors and matrices in R, Matrix multiplication and inversion, Eigen values and Eigen vectors

Suggested Reading:

1. A first Course in Statistical Programming with R, W. John Braun, Duncan J. Murdoch, Cambridge University Press, 2007.
2. <https://cran.r-project.org/manuals.htm>

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. VI-SEMESTER
BASICS OF MECHATRONICS (OPEN ELECTIVE -VI)

Instruction:1Hrs /week	SEE Marks : 50	Course Code : OE600ME
Credits : 1	CIE Marks: : 30	Duration of SEE : 2Hrs

Course objectives	Course Outcomes
The objectives of this course are to: 1. identify the need for mechatronics and its applications 2. study various fluid power systems 3. access various electronic components and devices and design mechatronic systems	<i>On completion of the course, the student will be able to:</i> 1. interpret the importance of mechatronics and elements involved 2. design various fluid power systems for mechatronics applications. 3. Study various industrial electronic devices and integrated circuits. 4. analyze various measurement systems and and to study micro controller based CNC machines.

UNIT – I

Introduction to mechanization & automation.

Concept of Mechatronics: Flow chart of mechatronics systems, Actuators and control system, Application in industries.

Introduction to drive mechanisms and electrical actuators: servo motors and stepper motors.

Introduction to fluid power systems: Industrial pneumatics and hydraulics, Merits of fluid power systems, Pneumatic and hydraulic elements and their symbols, Study of hydraulic control valves, pumps & accessories, Hydraulic circuits and electro – hydraulic circuits.

UNIT – II

Introduction to industrial electronic devices: Diodes, Transistors, Silicon controlled Rectifiers (SCR), Integrated Circuits (IC)

Measurement systems: sensors, digital-to-analog and analog-to-digital conversion.

Introduction to microprocessor & micro controller: Applications of mechatronics in the design of modern CNC machines.

Learning Resources:

1. W. Bolton, "Mechatronics", 3rd Ed., Pearson Education, India, 2007
2. HMT Limited, "Mechatronics, Tata Mc.Graw– Hill Publishing Company Limited; New Delhi, 1998.
3. Michael B Histan& David G. Alciatore, "Introduction to Mechatronics and Measurement systems", 4th Ed., Tata McGraw-Hill International edition, 2012

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. VI-SEMESTER
OPTIMIZATION METHODS FOR ENGINEERS (OPEN ELECTIVE -VII)

Instruction : 2 Hours /week	SEE Marks : 70	Course Code : OE610ME
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hours

Course objectives	Course Outcomes
The objective of this course is to: understand Linear & non-linear programming, transportation modeling , CPM & PERT for project scheduling and control.	On completion of the course, the student will be able to: <ol style="list-style-type: none">1. explain simplex, dual simplex, revised simplex and sensitivity analysis for shop floor problems.2. Solve transportation model problems and their optimization using Modi method.3. apply unconstrained and constrained methods like Univariate, steepest descent, Newton etc. for Non linear programming.4. apply the techniques like CPM and PERT for project management.

Unit-I

Optimization-An overview

Meaning of Optimization-Origin of Optimization-Introduction to Linear programming problems (LPP) -Formulation of LPP- Graphical method, simplex method

Unit-II

Advanced topics in Linear programming

Duality in LPP, Differences between primal and dual, Dual simplex method, Revised simplex method, sensitivity analysis

Unit-III

Transportation Model

Definition of the transportation model-matrix of Transportation model-Formulation and solution of transportation models- Methods for calculating Initial basic feasible solution-Optimization of transportation model using MODI method.

Unit-IV

Non linear programming problems

Optimization methods for single variable, multivariable functions, Maxima-Minima; Non linear programming unconstrained optimization: Random search, Univariate model; Non linear programming constrained optimization: Steepest descent, Conjugate Gradient, Newton.

Project Scheduling

Introduction to network analysis, Rules to draw network diagram, Fulkerson rule for numbering events, Critical path method, PERT.

Learning Resources:

1. ErPrem Kumar Gupta and Dr. DS Hira, "Operations Research ", S.Chand& Company Pvt. Ltd., 2014.
2. NVS Raju, "Optimization methods for Engineers ", PHI Learning Pvt. Ltd. ., 2014
3. SingiresuS.Rao, "Engineering optimization- Theory and Practice", 4th Edition, John Wiley and Sons, 2009.
4. R. Paneerselvam, "Operations Research", PHI Learning Pvt Ltd., 2009.

DEPARTMENT OF MECHANICAL ENGINEERING
SYLLABUS FOR B.E. VI-SEMESTER
ADVANCES IN ENTREPRENEURSHIP (OPEN ELECTIVE -VII)

Instruction : 2 Hrs/week	SEE Marks : 70	Course Code : OE620ME
Credits : 2	CIE Marks: 30	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The objectives of the course is to 1. understand how to expand business and increase revenues. 2. understand various aspects of finance. 3. understand legalities of running a business.	After completion of the course, the student will be able to 1. understand growth strategies of a start-up & to identify ways and means of expanding customer base. 2. understand customer retention strategies. 3. develop ways and means of growing revenues and develop financial modelling. 4. understand legal formalities and IPR.

UNIT-I

Orientation to Growth: Stages of a Start-up Company, Infant Mortality of Start-up's, Sustaining the Phase of Launching, Growth Opportunities, Diversification and Expansion of Business, Growth Assessment, SWOT Analysis, Growth strategies adopted by Ideal Start-up, Ansoff Growth Matrix, Six ways of Adjacencies for Growth. Case Study of Nike.

Expanding Customer Base: Customer Segmentation: Division of market into segments, Evaluating the Profitability of Segments. Developing Business Model in relation to the current customers. Changing customer segments and revisit of Business Models. Evaluation of Business Models for new customer segments. Critical evaluation of Business Models Old Vs New. Risk of changing the Business Models. Analyzing the scalability of business model using Break Even Analysis.

UNIT-II

Traction and Business: Meaning of Business Traction Process, and Metrics to Measure Business Traction, Customer Retention, Customer Churning, Relationship Business, Customer Life Time Value. Identifying the unnecessary moves in business traction. Traction of business model using Bull's-eye framework. Measuring the effectiveness of selected channels. Budgeting and Planning.

UNIT-III

Growing Revenues: Identifying Growing Revenues, Stabilising growing revenues, Developing additional revenues (licensing and franchising). Exploring New channels and Partnerships for growth revenues. Evaluating the Growth streams based on longevity. Lean Start-up Canvas.

Sales Planning & Financial Modelling: Understanding the customer buying decision behaviour, setting sales plans, sales targets, Art of Pitching the sales, Selling Process, Building a professional sales team, Sales management. Price Sensitivity of Market. Optimisation of cost and operational expenses. Financial modelling of the Venture, Assessment of competitors and Peer's financial models.

UNIT-IV

Support System: Legal Management in Start-ups: Issues and Legal constraints effecting the business. Need for professional services: Legal consultancy and Accounting. Need for proper documentation for fool-proof administration of business. Intellectual Property rights and their importance. Business Mentoring, role of experts in managing business.

Learning Resources:

1. Entrepreneurship Rajeev Roy "Oxford,2012
2. Fundamentals of Entrepreneurship Nandan H,PHI,2013
3. Robert D Hisrich, Michael P Peters , Dean A Shepherd, Entrepreneurship , Sixth Edition, New Delhi, 2006.
4. S.S.Khanka, Entrepreneurial Development, S.Chand and Company Limited, New Delhi,2001