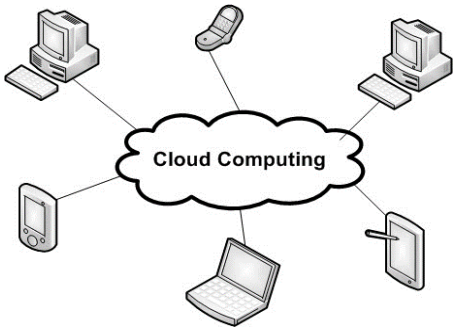
With effect from the Academic Year 2018-19

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

SCHEME OF INSTRUCTION AND SYLLABI UNDER CBCS FOR B.E. (IT) V AND VI SEMESTERS WITH EFFECT FROM 2018-2019 (For the batch admitted in 2016-17)



DEPARTMENT OF INFORMATION TECHNOLOGY
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VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)
DEPARTMENT OF INFORMATION TECHNOLOGY
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			
			Periods per week				Duration in Hrs	Maximum Marks		Credits
			L	T	D	P		SEE	CIE	
1	PC510IT	Microprocessor & Microcontroller	3	1	-	-	3	70	30	3
2	PC520IT	Operating Systems	3	1	-	-	3	70	30	3
3	PC530IT	Computer Networks	3	-	-	-	3	70	30	3
4	PC540IT	Software Engineering	3	1	-	-	3	70	30	3
5	PC550IT	Theory of Automata	3	1	-	-	3	70	30	3
6	HS510EH	Finishing School -III: Soft Skills	1	1	-	-	1.5	35	15	1
7	MC510IT	Finishing School -III: Technical Skills	1	1	-	-	1.5	35	15	1
8	OE5XXXX	Open Elective-IV	1	-	-	-	2	50	30	1
9	OE5XXXX	Open Elective-V	2	-	-	-	3	70	30	2
PRACTICALS										
10	PC511IT	Microprocessor & Microcontroller Lab	-	-	-	2	3	50	25	1
11	PC521IT	Operating Systems Lab	-	-	-	2	3	50	25	1
12	PC531IT	Computer Networks Lab	-	-	-	2	3	50	25	1
		Total	**20**	**6**	**-**	**6**	**-**	**690**	**315**	**23**
		Grand Total	**32**				**-**	**1005**		

VASAVI COLLEGE OF ENGINEERING(AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF INFORMATION TECHNOLOGY

Syllabus for B.E V- SEMESTER

MICROPROCESSOR & MICROCONTROLLER

Instruction: 3+1 Hrs/ week	**SEE Marks** : 70	**Course Code** :**PC510IT**
Credits : 3	**CIE Marks**:30	**Duration of SEE** : 3 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Learn different Processor architectures and 8051 microcontroller architecture and write assembly language programs for interfacing different peripherals.	1. Apply the architectural concepts of 8085 and 8086 Microprocessor and its instruction set in writing assembly language programs. 2. Apply the architectural concepts of 8051 microcontroller and its instruction set in writing assembly language programs. 3. Explain the architecture of different peripherals. 4. Design appropriate interface circuits to connect different peripherals to the processor or microcontroller. 5. Write assembly language programs for interfacing different peripherals using a microprocessor and a microcontroller.

UNIT-I: General definitions of mini computers, microprocessors, micro controllers, 8085 processor Architecture and its operations. , 8085 signal functions, instruction cycles, Machine cycles, T states, timing diagrams, Addressing modes. Instruction set, Assembly language programming.

UNIT-II: 8086 Microprocessor Architecture, Addressing modes, instruction set and Assembler directives. Assembly language programming, stack, procedures, Macros, interrupts and interrupt service routines, 8086 signals, minimum mode and maximum mode configurations, timing diagrams, Coprocessor.

UNIT-III: Interfacing with 8086: RAMs, ROMs, Interfacing with peripheral ICs like 8255, 8254, 8257, 8259, 8251, interfacing with key boards, LEDs, stepper motor, ADCs, and DACs etc.

UNIT-IV: Overview of the architecture of 8051 microcontroller, signal functions, I/O port circuits, addressing modes, Instruction set , Assembly language programming.

UNIT-V: Interfacing with 8051, keyboards, LEDs, LCDs, ADC, DAC, stepper motor, Introduction to advanced processors.

Suggested Reading*:*

1. Ramesh S Gaonkar, Microprocessor Architecture, Programming, and Applications with the 8085, 5/E Prentice Hall, 2002.
2. I. Liu, G. A. Gibson, Microcomputer Systems: The 8086/8088 Family, 2nd Ed., Prentice Hall, 1986.
3. Douglas Hall, Microprocessors Interfacing, Tata McGraw Hill, 1991
4. A.K.RAY and K.M.Bhurchandi ,Advanced Microprocessors and peripherals 2nd edition Tata McGraw Hill
5. Barry B.Brey&C.R.Sarma The Intel Microprocessors 8086, 8088, 80188, 80186, 80286, 80386, 80486,Pentium, Pearson Education
6. Kenneth J.Ayala, 'The 8051 microcontroller Architecture, Programming and applications' second edition, Penram international.
7. Muhammad Ali Mazdi& Janice GillispieMazdi, The 8051 Microcontroller and Embedded Systems, Prentice-Hall, Inc.

DEPARTMENT OF INFORMATION TECHNOLOGY
Syllabus for B.E V- SEMESTER
OPERATING SYSTEMS

Instruction: 3+1 Hrs/ week	**SEE Marks** : 70	**Course Code** :**PC520IT**
Credits : 3	**CIE Marks**:30	**Duration of SEE** : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	**At the end of the course student will be able to:**
Learn the principles of modern operating systems i.e various functionalities provided by an operating system such as process management, memory management, Storage and I/O management.	1. Analyze the importance and its key principles by differentiating and categorizing the functionalities of an operating system 2. Examine mechanisms involved in memory management to handle processes and threads. 3. Evaluate and solve deadlocks by assessing various handling strategies related to each of the conditions for deadlock. 4. Interpret the mechanisms adopted for file organization and access. 5. Compare and contrast key features and functionality of major operating systems, such as Windows and LINUX.

UNIT-I

Introduction: Operating System Functionalities, Types of Operating Systems, User Operating System Interface, System calls, System Boot. **Process Concept:** Overview, Threads. **Process Scheduling** - Uniprocessor scheduling algorithms, Multiprocessor and Real-time scheduling algorithms.

UNIT-II

Memory Management: Background, Swapping, Contiguous Memory Allocation, Paging, Segmentation. Virtual Memory Management: Demand Paging, Page replacement algorithms, Thrashing, Allocating Kernel Memory.

UNIT-III

Inter Process Communication**, Process Synchronization** - Peterson's Solution, Bakery Algorithm, Semaphores, Critical Section, Monitors. Classical problems of synchronization. **Deadlocks:** Deadlock prevention, deadlock avoidance and Deadlock Detection and Recovery - Bankers Algorithm.

UNIT-IV

Storage and I/O Management: File System-Basic Concepts, File System Structure, File System Mounting, Directory Structure, Allocation Methods, Free Space Management.

I/O Management: Disk Structure, RAID Structure, Disk Scheduling, **Protection :**Goals of Protection, Principles of Protection, Domain of Protection, Access Matrix.

UNIT-V

Case Study: Windows 7 : Design Principles, System Components, Terminal Services & Fast User Switching, File System, Networking, Programmer Interface.

Case Study: The Linux System : Design Principles, Kernel Modules, Process Management, Scheduling, Memory Management, File System, Input Output, Inter Process Communication, Network Structure, Security.

Suggested Reading:

1. Operating System Concepts - Operating System Concepts, Sixth Edition, Abraham Silberschatz, Peter Baer Galvin, Greg Gagne, John Wiley & Sons Inc.

References:

1. Modern Operating Systems- Andrew S Tanenbaum, Prentice Hall
2. Operating Systems - Operating System: Internals and Design Principles , William Stallings
3. Operating Systems - System Programming and Operating Systmes D M Dhamdhere, Tata Mc Graw Hill
4. Operating Systems - Operating Systems: A Modern Perspective, Gary Nutt, Addison Wesley
5. Operating Systems - Operating Systems, Achyut S Godbole, Tata Mc Graw Hill
6. Design of the Unix Operating System - Maurice Bach, Prentice Hall.

DEPARTMENT OF INFORMATION TECHNOLOGY
Syllabus for B.E V- SEMESTER
COMPUTER NETWORKS

Instruction: 3 Hrs/ week	**SEE Marks** : 70	**Course Code** :**PC530IT**
Credits : 3	**CIE Marks**:30	**Duration of SEE** : 3 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Understand the fundamental concepts of computer networks and Socket programming, know the role of various layers and protocols and security policies.	1. Identify the different types of network topologies and protocols, networking devices, reference models and network programming concepts. 2. Demonstrate the network layer concepts, the routing algorithms,& congestion control algorithm. 3. Describe the Transport layer protocols. 4. Develop solutions for Application layer protocols. 5. Understand the cryptographic methods and algorithms.

UNI T-I

Introduction: Uses of Computer Networks, Network Hardware, Network Software: Reference Models (ISO -OSI, TCP/IP).

Network Programming: Socket Interface: Sockets, Socket Address structures, Elementary Sockets, Advanced Sockets: Socket Options, Out of Band data, Daemon process and Internet Super Server.

Remote Procedure Calls: Introduction, Transparency Issues and Sun RPC.

UNI T-II

Network Layer: Introduction: Forwarding and routing, Routing Algorithms, Congestion Control Algorithms, Quality of Service.

Internetworking: Concatenated virtual circuits, Connectionless Internetworking, Tunneling, Internetwork routing, Fragmentation.

UNIT-III

Network layer in the Internet: Internet Protocol, IP addresses, IPv4, IPv6, Interoperability of IPv4 and IPv6, Internet Control protocols, OSPF, BGP, Internet Multicasting.

Transport Layer: Overview of the transport layer in the internet, Connection-Oriented Transport: TCP, Connectionless Transport: UDP.

UNIT-IV

Application Layer:

World Wide Web: Architectural Overview, Static Web Documents, Dynamic Web Documents, HTTP, FTP.

Electronic Mail: SMTP, Comparison with HTTP, Mail Message Formats and MIME, Mail Access Protocols.

DNS:The Internet's Directory service: Services provided by DNS, Overview of How DNS works, DNS Records and Messages.

UNIT-V

Network Security: Cryptography, Symmetric Key Algorithms, Public Key Algorithms, Digital Signatures, Management of Public Keys, Authentication Protocols.

Text Book:

1. James F. Kurose, Keith W. Ross, "Computer Networking, A Top-Down Approach Featuring the Internet", Sixth Edition, Pearson Education, 2012.
2. W. Richard Stevens, "Unix Network Programming" Prentice Hall/Pearson Education, 2009.
3. Larry L. Peterson, Bruce S. Davie,"Computer Networks: A Systems Approach", Fifth Edition, Morgan Kaufmann Publishers Inc., 2011.

Suggested Reading:

1. William Stallings, "Data and Computer Communications", Tenth Edition, Pearson Education, 2013.
2. Douglas E. Comer, "Internetworking with TCP/IP (Volume I) Principles, Protocols and Architecture", Sixth Edition, Pearson Education, 2013.
3. Behrouz A. Forouzan and FirouzMosharraf, "Computer Networks:A Top Down Approach", Tata McGraw-Hill, 2011.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E V- SEMESTER
SOFTWARE ENGINEERING

Instruction: 3+1Hrs/ week	**SEE Marks** : 70	**Course Code** :**PC540IT**
Credits : 3	**CIE Marks**:30	**Duration of SEE** : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	**At the end of the course student will be able to:**
Understand the various SDLC models and stages in Software design lifecycle.	1. Select the most suitable software process model out of several, for the development of a given software project. 2. Develop the ability to elicit, analyze and specify software requirements through a productive working relationship with various stakeholders of the project. 3. Understand the software design principles and learn how to apply them towards implementation. 4. Compare different ways and techniques of ensuring software quality and apply various test processes and techniques on conventional applications. 5. Develop an understanding of risks inherent to software development, and provide continuous quality improvement

UNIT I

Introduction to Software Engineering: Definition of Software Engineering, application areas of software engineering, Process Framework, Process Patterns, Process Assessment, Personal and Team Process Models, Process Technology, Product and Process.

Process Models: Prescriptive Models, Waterfall Model, Incremental Process Models, Evolutionary Process Models, Specialized Process Models, and the Unified Process.

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

UNIT II

Understanding requirements: Requirement Analysis, Data Modeling Concepts, Scenario-Based Modeling, Flow-Oriented Modeling, Class-Oriented Modeling, Creating a Behavioral Modeling

Design Engineering: Design within the context of SE, Design Process, Design Concepts, and the Design Model.

UNIT III

Architectural Design: Software Architecture, Architecture Genres, Architecture Styles, Architectural Design.

Component level Design: What is a Component, Designing Class-Based Components, Conducting Component-Level Design, Component-Based development and Object Constraint Language.

Performing User Interface Design: The Golden rules, User Interface Analysis and Design, Interface Design Steps, and design Evaluation.

UNIT IV

Software Testing Strategies: A Strategic Approach to Software Testing, Strategic Issues, Validation Testing, System Testing, Black-box and White-box testing, Basis path testing, and Control Structure testing and the Art of Debugging.

Software Quality Assurance (SQA): Elements of Software Quality Assurance, SQA Tasks, Goals and Metrics, and SQA Plan, Software Configuration Management CMMI, ISO 9000 Quality Standards.

UNIT V

Product Metrics: A Framework for Product Metrics, Metrics for the Requirements Model, Metrics for the Design Model, Metrics for Testing, and Metrics for Maintenance.

Risk Management: Software Risks, Reactive Vs Proactive Risk Strategies, Risk Mitigation, Monitoring and management, and RMMM Plan.

Suggested Reading:

1. Roger S.Pressman, Software Engineering: A Practitioners Approach, Seventh Edition, McGraHill, 2009.

References:

1. Pankaj Jalote "An Integrated Approach to Software Engineering, Third Edition, Narosa Publishing house, 2008.
2. James F.Peters, WitoldPedrycz, Software Engineering-An engineering Approach, John Wiley Inc., 2000.
3. Ali Behforoz and Frederic J.Hadson, Software Engineering Fundamentals, Oxford University Press, 1997.

DEPARTMENT OF INFORMATION TECHNOLOGY
Syllabus for B.E V- SEMESTER
THEORY OF AUTOMATA

Instruction: 3+1Hrs/ week	**SEE Marks** : 70	**Course Code** :**PC550IT**
Credits : 3	**CIE Marks**:30	**Duration of SEE** : 3 Hours

Course Objective:	Course Outcomes:
The course will enable the students to:	**At the end of the course student will be able to:**
Introduce central concepts in theory of computation and to design grammars and recognizers for different formal languages, and also to determine the decidability and intractability of computational problems.	1. Design finite automata, RE's for a given language. 2. Define properties of RL's, Design grammars, minimize FA and also apply the concept of pumping lemma to prove that certain languages are not regular. 3. Design PDA's for various CFG's and CFL's, simplify the CFG's, define properties of CFL's. 4. Define programming techniques of Turing machines and design Turing machines for decidable problems 5. Apply mathematical and formal techniques for solving problems in computer science and also define concepts of computability theory, and complexity theory.

UNIT I

Finite Automata: Introduction, Central Concepts of Automata Theory, Deterministic Finite Automata, Nondeterministic Finite Automata, NFA to DFA Conversion, Finite Automata with Epsilon Transitions, Equivalence between NFA with and without Epsilon Transitions.

Regular Expressions: Regular Expressions, Identity Rules for Regular Expressions, Algebraic Laws for Regular Expressions, Equivalence between Finite Automata and Regular Expressions, Applications of Finite Automata and Regular Expressions.

UNIT II

Properties of Regular Languages: Pumping Lemma for Regular Languages, Closure Properties of Regular Languages, Decision Properties of Regular Languages, Equivalence between two FSM's, Minimization of Finite Automata.

Grammars and Languages: Chomsky Hierarchy of Languages, Grammars and Languages Generated, Context-Free Grammars, Derivations, Parse Trees, Ambiguity in Grammars and Languages.

UNIT III

Pushdown Automata: Introduction, Formal Definition and Behavior of PDA, Language of PDA, Design of PDA, Equivalence of PDA and CFG's, Introduction to DCFL and DPDA.

Properties of Context Free Languages: Simplification of CFG's, Normal Forms for CFG's: CNF and GNF, Pumping Lemma for Context Free Languages, Closure Properties of Context Free Languages, Decision Properties of Context Free Languages

UNIT IV

Turing Machines: Introduction, Formal Definition and Behavior of TM, Language of a TM, Design of TM's, Programming Techniques for TM's, Extensions to the TM's, Restricted TM's.

UNIT V

Undecidability: Recursive and Recursively Enumerable Languages, Properties of Recursive and Recursively Enumerable Languages, The Church-Turing Thesis, A Language that is not Recursively Enumerable, An Undecidable Problem that is RE, PCP and MPCP.

Intractable Problems: The classes P and NP, An NP complete Problem, A Restricted Satisfiability Problem.

Suggested Reading:

1. John E.Hopcroft, Rajeev Motwani, Jeffery D Ulman, Introduction to Automata Theory Languages And Computation, Third edition, Pearson Education.
2. Theory of Computer Science- Automata languages and computation –Mishra and Chandrashekaran, Third edition, PHI
3. K.Krithivasan and R.Rama; Introduction to Formal Languages, Automata Theory and Computation; Pearson Education, 2009.
4. John C. Martin, Introduction to Languages and The Theory of computation, Third edition, Tata McGraw Hill, 2003.

DEPARTMENT OF HUMANITIES & SOCIAL SCIENCES
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
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 1. Numerical Ability 2. Arithmetic Ability 3. General reasoning	**At the end of the course, students will be able to:** 1. Solve questions on the above mentioned areas using short cuts and smart methods 2. Understand the fundamentals concepts of Aptitude skills 3. 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 INFORMATION TECHNOLOGY
SYLLABUS FOR B.E V- SEMESTER
FINISHING SCHOOL-III: TECHNICAL SKILLS

Instruction:1+1Hrs/ week	**SEE Marks** : 35	**Course Code** :**MC510IT**
Credits : 1	**CIE Marks**:15	**Duration of SEE** : 1.5 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Gain knowledge about advanced programming concepts such as Generics, Collections and Graphical User Interface design using Swing.	1. Apply generics to provide compile time type safety for collection framework. 2. Demonstrate the usage of Collection framework's interfaces and implementations. 3. Demonstrate the usage of Collection Framework Algorithms. 4. Develop GUI application using swing components, containers, layout managers and event handling mechanism.

Unit I

Introduction to Generics, Defining Generics, Generics and Subtyping, Wildcards, Generic Methods.
Introduction to Collections, Collection Framework, Benefits of Collections Framework.

Unit II

Collection Framework Interfaces : The Core Collection Interface Hierarchy, Collection , Set, List, Queue, Deque, Sorted Set, Map, Sorted Map. Traversing Collections.

Unit III

Collection Framework Implementations: Hash Set, Linked Hash Set, Tree Set, Array List, LinkedList, Stack, Vector, Priority Queue, Array Deque, HashMap, Hash table, Tree Map.

Unit IV

Collection Framework Algorithms: Sorting, Shuffling, Routine Data Manipulation, Searching, Composition, Composition, Finding Extreme Values.

Unit V

Introduction to JFC and Swing , Swing Components, Containers, Layout Managers, Modifying Look and Feel, Event Handling.

Suggested Reading:

1. Herbert Schildt, The Complete Reference Java, 7th Edition, Tata McGraw Hill, 2007.
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, Tata McGraw Hill, 2009.
5. Kathy Sierra, Head First Java, 2/e, Shroff Publishers, 2012.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E V- SEMESTER
MICROPROCESSOR & MICROCONTROLLER LAB

Instruction:2Hrs/ week	**SEE Marks** : 50	**Course Code** :**PC511IT**
Credits : 1	**CIE Marks**:25	**Duration of SEE** : 3 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Learn the instruction set and interfacing techniques of 8085, 8086 microprocessors and 8051 Microcontroller.	1. Write Assembly Language Programs using 8085 microprocessor. 2. Write Assembly Language Programs using 8086 microprocessor 3. Write Assembly Language Programs using 8051 microcontroller. 4. Write Assembly Language programs for interfacing different peripherals to 8085, 8086 processors and 8051 microcontroller.

1. Tutorials on 8085, 8086 &8051 Programming.
2. Interfacing and programming of 8255. (E.g. traffic light controller).
3. Interfacing and programming of 8254.
4. Interfacing and programming of 8279.
5. A/D and D/A converter interface.
6. Stepper motor interface.
7. Display interface.

Note: Adequate number of programs covering all the instructions of 8085 & 8086 &8051instruction set. Experiments should be done on the 8085,8086 microprocessor and 8051 microcontroller trainer kits and Assembler.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E V- SEMESTER
OPERATING SYSTEMS LAB

Instruction:2Hrs/ week	SEE Marks : 50	Course Code :**PC521IT**
Credits : 1	CIE Marks :25	Duration of SEE : 3 Hours

Course Objective:	**Course Outcomes:**
The course will enable the students to:	**At the end of the course student will be able to:**
Learn the usage of system calls along with applying the concepts of inter process communication and process synchronization.	1. Write programs which interact with the operating system using system calls . 2. Write programs to demonstrate inter process communication. 3. Write programs to demonstrate process synchronization. 4. Write programs for threads creation and manipulation.

1**.** Familiarity and usage of system calls of Linux on
a) File management (open,close, read, write, open dir, readdir, stat etc)
b) Process management (fork, exec ,getpid, wait exit etc)
2**.** Implement a program to get and set the environment variables using system calls.
3**.** Implementation of Echo server using pipes.
4. Implementation of Echo server using shared memory.
5. Implementation of Echo server using messages.
6. Implementation of Producer Consumer Problem using semaphores.
7 . Implementation of Producer Consumer Problem using message passing.
8. Implementation of Reader-writer problem using semaphores.
9. Implementation of Dining philosophers problem using semaphores.
10. Creating threads and manipulating under Linux platform.

Suggested Reading:

1. W. Richard Stevens, Unix Network Programming, Prentice Hall/Pearson Education,2009.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E V- SEMESTER
COMPUTER NETWORKS LAB

Instruction:2Hrs/ week	**SEE Marks** : 50	**Course Code** :**PC531IT**
Credits : 1	**CIE Marks**:25	**Duration of SEE** : 3 Hours

Course Objective:	Course Outcomes:
The course will enable students to:	**At the end of the course student will be able to:**
Understand the use of client/server architecture in application development, use socket system calls, and Java Socket API to implement network routing algorithms, application layer protocols and encryption algorithms.	1. Demonstrate the usage of socket system calls and basics of network programming 2. Use network programming concepts to develop client-server applications. 3. Implementation of application layer protocols. 4. Implementation of Public Key Encryption Algorithm.

1. Understanding and using of commands like ifconfig, netstat, ping, arp, telnet, ftp, finger, traceroute, whois etc.
2. Usage of elementary socket system calls [socket(), bind(), listen(), accept(),connect(),send(), recv(), sendto(), recvfrom()].
3. Implementation of Connection oriented iterative service (TCP).
4. Implementation of Connection oriented concurrent service (TCP).
5. Implementation of Connectionless Iterative service (UDP).
6. Implementation of Connectionless concurrent service (UDP).
7. Implementation of remote command execution using socket system calls.
8. Implementation of Distance Vector Routing Algorithm.
9. Implementation of HTTP.
10. Implementation of SMTP.
11. Implementation of RSA algorithm.

Note: Implement programs 3 to 7 in C and 8 to 10 in Java.

Suggested Reading:

1. W. Richard Stevens, "Unix Network Programming", Prentice Hall, Pearson Education, 2009.
2. Douglas E.Comer, "Hands-on Networking with Internet Technologies", Pearson Education.

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN
B.E- V and VI 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

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**
The objectives of the course are to introduce	*Upon the completion of the course, students are expected to*
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**
Objectives of this course are to	*Upon the completion of the course, students are expected to*
1. Provide fundamental knowledge on geo spatial technology such as remote sensing	1. Explain the basic principles of remote sensing to analyse the surface featureson 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

DEPARTMENT OF CIVIL ENGINEERING
SYLLABUS FOR B.E. V-SEMESTER
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**
Objectives of this course are to	*Upon the completion of the course, students are expected to*
1. To provide fundamental knowledge on geo spatial technology such as GPS	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**
Objectives of this course are to	*Upon the completion of the course, students are expected to*
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.	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)

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
• Understand the concepts involved in the lifecycle of software development • Learn the best practices to be employed for the design and testing.	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 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. 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)

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
• Apply object oriented principles for developing an application using Java constructs • Design GUI using existing Java classes and interfaces	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 application 3. Read and write the IO operations using console and files streams 4. 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:

https://docs.oracle.com/javase/tutorial/java

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**
To understand the concept of telemetry systems.	**At the end of the course, students will be able to:** 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. Deergha, 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:** 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:** 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 ofpowerdiode, 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 bride 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.	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 finaaly 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, StringBuffer.

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, Tata McGraw Hill, 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 Hr/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 • 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 1. understand the fundamentals of Additive manufacturing Technologies for engineering applications. 2. Understand the methodology to manufacture the products using FDM technology 3. study the applications, advantages and case studies of FDM technology. 4. 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. Amithaba Ghose, "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:2Hours /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. Classifythe 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 : • 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: 1. understand entrepreneurship as a career option and develop customers, channels and traction 2. understand the method of creating business model and make a minimum viable product. 3. develop costing and pricing strategies 4. understand team building and its importance 5. 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-Lean 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. MadhurimaLall and ShikhaSahai, "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 • Basics of luminescence and display devices	**At the end of the course students will be able to** 1. List out different types of luminescence mechanisms 2. Classify types of display devices 3. Explain working of some display devices 4. 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 VACCUM 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 • Fundamentals of vacuum technology	**At the end of the course students will be able to** 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'HanlonA 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 • Basics of acoustics and non- destructive testing	**At the end of the course students will be able to** 1. Illustrate non-destructive testing 2. Explain production mechanisms of ultrasonics 3. Differentiate various methods of non-destructive testing 4. 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. KshirSagar, 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 • Liquefaction of gases • Fundamentals of cryogenics	**At the end of the course students will be able to** 1. Define ranges of liquid temperatures 2. 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 • Essentials of smart materials • Different types of smart materials	**At the end of the course students will be able to** 1. List out various properties of functional materials 2. Identify smart materials based on properties and their appropriate usage. 3. Write different types of smart materials 4. 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 • Fundamentals of thin film technology • Properties and preparation mechanisms	**At the end of the course students will be able to** 1. Differentiate bulk materials and thin films 2. 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:**
1. To familiarize with various types of liquid crystals, their chemical constitution and behavior 2. To acquaint with different types of sensors and chemistry involved in them 3. To discuss the conductance in polymers and mechanism of conductance in undoped and doped polymers	1. Explain the classification, types and applications of liquid crystals 2. Discuss the principles, mechanism and applications of potentiometric and amperometric sensors 3. Explain the principle, mechanism and applications of fluorophore based, chromophore based and enzyme based fibre optic biosensors 4. 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 Non-mediatedFiber Optic Biosensors.

Suggested Reading:

4. P.C.Jain and Monica Jain, "Engineering Chemistry", DhanpatRai 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 Meterials 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. Billmeyar 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:**
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	1. Explain the classification and types of polymerization methods 2. 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", DhanpatRai Pub, Co., New Delhi (2002)
2. Shasi Chawla, "Text Book of Engineering Chemistry", Dhanpat Rai Publishing Company, NewDelhi (2008).
3. S.S. Dara "A text book of engineering chemistry" S.Chand&Co.Ltd., New Delhi (2006).
4. Chemistry of Engineering Meterials 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, chlorofloro 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:**
• 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.	1. Discuss the construction, electrochemistry, technology and applications of selected primary batteries 2. Discuss the construction, electrochemistry, technology and applications of few secondary batteries 3. Explain the working principle, electrochemistry, technology and applications of prominent fuel cells 4. Choose a suitable battery or a fuel cell for a given application 5. 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 Meterials 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:**
1. To acquaint with the causes and factors influencing the rate of corrosion 2. To understand the different types of corrosion like dry, wet and galvanic corrosion and their relative impact 3. 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.	1. Explain different types of corrosion with suitable examples 2. Analyze the given case study and diagnose the type of corrosion in a given corrosion problem 3. Discuss different factors that affect corrosion and passivation of metals 4. Select a suitable metallic coating for corrosion control of the equipment in a given application 5. Explain the mechanism by which organic coatings and inhibitors control corrosion of metals 6. Discuss the principles and application of cathodic protection and surface conversion coatings for corrosion control

UNIT-I: Chemical and Electrochemical Corrosion

Introduction - gravity, **cause, C**hemical 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. **F**ormation 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, Electro plating & 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 Meterials 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:**
• 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.	1. write effective reports 2. research and write project proposals and SOPs 3. 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 INFORMATION TECHNOLOGY
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			
			Periods per week				Duration in Hrs	Maximum Marks		Credits
			L	T	D	P		SEE	CIE	
1	HS500EH	Economics and Finance for Engineers	2	1	-	-	3	70	30	2
2	PC610IT	Web Technologies	3	1	-	-	3	70	30	3
3	PC620IT	Compiler Construction	3	1	-	-	3	70	30	3
4	PC630IT	Embedded Systems	3	1	-	-	3	70	30	3
5	PE6XXIT	Professional Elective-1	3	-	-	-	3	70	30	3
6	HS610EH	Finishing School – IV : Soft Skills	1	1	-	-	1.5	35	15	1
7	MC6XXIT	Finishing School – IV -Technical Skills	1	1	-	-	3	35	15	1
8	MC500EH	Human Values and Professional Ethics -II	1	-	-	-	2	50	30	1
9	OE6XXXX	Open Elective - VI	1	-	-	-	2	50	30	1
10	OE6XXXX	Open Elective - VII	2	-	-	-	3	70	30	2
PRACTICALS										
11	PC611IT	Web Technologies Lab	-	-	-	2	3	50	25	1
12	PC621IT	Compiler Construction Lab	-	-	-	2	3	50	25	1
13	PC631IT	Embedded Systems Lab	-	-	-	2	3	50	25	1
		Total	**20**	**6**	**-**	**6**	**-**	**740**	**345**	**23**
		Grand Total	**32**				**-**	**1085**		

Professional Elective-I

1. PE610IT Advanced Computer Architecture
2. PE620IT Artificial Intelligence
3. PE630IT Digital Signal Processing
4. PE640IT Network Security
5. PE650IT Data Mining

Open Electives:

1. OE610IT: Introduction to Web Technologies

2.OE620IT: Statistical Programming using R

Finishing School -IV: Technical Skills

1. MC610IT: Fundamental Programming Skills
2. MC620IT: Advanced Programming Skills

SYLLABUS FOR B.E-V SEMESTER
ECONOMICS AND FINANCE FOR ENGINEERS

Instruction: 2+1Hrs/week	**SEE Marks:** 70	Course Code: HS500EH
Credits: 2	**CIE Marks**:30	**SEE:** 3 hrs.

COURSE OBJECTIVES	**Course Outcomes**
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.	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 RBI 5. 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.LNarang., "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 KSinghania 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",* LakshmiNarain 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

VASAVI COLLEGE OF ENGINEERING (AUTONOMOUS)

9-5-81, Ibrahimbagh, Hyderbad-500031, Telangana State

DEPARTMENT OF INFORMATION TECHNOLOGY

SYLLABUS FOR B.E-VI SEMESTER

WEB TECHNOLOGIES

Instruction: 3+1 Hours / week	SEE Marks :70	Course Code: PC610IT
Credits : 3	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:**
Demonstrate the different ways of developing static, dynamic and responsive web applications using different technologies.	1. Design web applications using HTML, CSS and JavaScript. 2. Create Responsive web pages using Twitter Bootstrap and Zurb foundation. 3. Solve problems using Python in an efficient way. 4. Apply server side technologies like Servlets and JSP to create dynamic web applications. 5. Make use of concepts in PHP for accessing the database.

UNIT-I:

Introduction to Internet, World Wide Web, Web Browsers, Web Servers, Uniform Resource Locators, HTTP, Introduction to XHTML: Origins and Evolution of HTML and XHTML, Standard XHTML document structure, Basic Text Markup, Images, Hypertext Links, Lists, Tables, Frames. Cascading Style Sheets: Text Styles, Types of Style Classes, Block Styles, page layout with CSS. Basics of JavaScript: HTML forms - Overview of Java Script-Primitives, Operations and Expressions-Control Statements, Arrays, Functions, DOM, Element access in JavaScript, Events and event handling.

UNIT-II:

Twitter Bootstrap: The Grid system, Layout components. Zurb Foundation: The Grid system, Global styles, basic controls. Backbone js: Model, View, Collection. express js, Application development.

UNIT-III:

Python: Basics of python, Variables and types, Lists, Operators, Strings formatting, String operations, conditions, loops, functions, objects and classes, dictionaries, modules and packages.

Advanced python: generators, list comprehensions, multiple function arguments, regular expressions, exception handling, sets, serialization using JSON and pickle, partial functions, code introspection, compression, encoding and decoding ,decorators, frameworks.

UNIT-IV:

Java Servlets: Java Servlets and CGI Programming, Benefits of Java Servlet, Life cycle of Java Servlet, Reading data from client, HTTP Request header, HTTP Response header, working with cookies, Tracking Sessions. Java Server Pages: Introduction to JSP, JSP Tags, Variables and Objects, Methods, Control Statements, Loops, Request String, User Sessions, Session Object, Cookies.

UNIT-V:

Introduction to PHP: Overview of PHP, General Syntactic Characteristics, Primitives, Operations, Expressions, Control Statements, Arrays, Functions, Pattern matching, Form handling, Files, Cookies, Session Tracking. Database access Through Web: Architectures for Database Access-Database access with PHP.

Suggested Reading:

1. "Internet & World Wide Web How to Program", 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.
2. Robert W.Sebesta, "Programming the world wide web", Fourth Edition, Pearson Education,2008.
3. "Learning Python", 5th Edition, O'reilly
4. Jim Keogh, "The Complete Reference J2EE",Tata-McGraw-Hill,2002.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E.- VI SEMESTER
COMPILER CONSTRUCTION

Instruction: 3+1 Hours / week	SEE Marks :70	Course Code: PC620IT
Credits : 3	CIE Marks: 30	Duration of SEE: 3 Hrs

Course Objective:	Course Outcomes:
The course will enable the students to:	**At the end of the course student will be able to:**
Introduce the major concept areas of language translation, and to enrich the knowledge in various phases of compiler and its use.	1. Define the purpose and implementation approach of each phase of compilation, and also apply the knowledge of LEX tool to develop a Scanner. 2. Design top-down and bottom-up parsers. 3. Implement semantic rules for specifying the syntax and semantics of programming languages, and also transform an AST into intermediate representation. 4. Apply various optimization techniques on the Intermediate Representation. 5. Generate target code from the Intermediate Representation.

UNIT-I

Introduction to Compilers: Introduction, Language Processors, The Structure of a Compiler.

Lexical Analysis – The Role of Lexical Analyzer, Input Buffering, Specification of Tokens, Recognition of Tokens, The Lexical-Analyzer Generator-LEX.

UNIT-II

Syntax Analysis: Introduction, Context-Free Grammars.

Top-Down Parsing: Recursive Descent Parsing, Predictive Parsing, LL(1) Grammars. **Bottom-Up Parsing:** Shift-Reduce Parsing, Operator Precedence Parsing, Introduction to LR Parsing- SLR, More Powerful LR Parsers- CLR and LALR, Using Ambiguous Grammars, The Parser Generator- YACC.

UNIT-III

Syntax Directed Translation: Introduction, Syntax Directed Definitions, Evaluation Orders for SDD's, Applications of Syntax Directed Translation.

Intermediate Code Generation: Variants of Syntax Trees, Three-Address Code, Types and Declarations, Translation of Expressions, Type Checking.

UNIT-IV

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

Code Optimization: Introduction, Basic Blocks and Flow Graphs, Optimization of Basic Blocks, Machine Independent Optimizations – The Principal Sources of Optimizations.

UNIT-V

Code Generation: Introduction, Issues in the Design of a Code Generator, The Target Machine, A Simple Code Generator, Peephole Optimization, Register Allocation and Assignment, DAG for register allocation.

Suggested Reading:

1. Alfred V Aho, Monica S Lam, Ravi Sethi, Jeffrey D Ullman – Compilers: Principles, Techniques &Tools – Pearson Education, Second Edition, 2007
2. Leland L Bech, System Software: An Introduction to Systems Programming, Pearson Education Asia, 1997.
3. Kenneth C. Louden, Compiler Construction: Principles and Practice, Thompson Learning, 2003.
4. J.P. Bennet, Introduction to Compiler Techniques, Second Edition, Tata McGraw-Hill, 2003.

DEPARTMENT OF INFORMATION TECHNOLOGY
SYLLABUS FOR B.E-VI SEMESTER
EMBEDDED SYSTEMS

Instruction: 3+1 Hrs /week	SEE Marks :70	Course Code:**PC630IT**
Credits : 3	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 understand the architectural features of 8051 and ARM microcontrollers and apply them in the design of Embedded Systems.	1. Write Assembly language programs using 8051 microcontrollers for simple problems and for interfacing different peripherals to 8051 microcontroller. 2. Write assembly language programs using ARM controller for simple problems and for interfacing different peripherals to it. 3. Apply the concepts of Real time Operating Systems in the design of Embedded Systems. 4. Use the different software and hardware tools in the design of Embedded Systems. 5. Explain the different bus protocols like I2C and CAN and the architectural features of multiprocessor and distributed Embedded Systems.

Unit –I : Introduction to Embedded Systems

Introduction, Complex Systems and Microprocessor, Embedded System Design Process, Formalisms for System Design, Design Examples. The 8051 Architecture: Introduction, 8051 Micro controller Hardware, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data Input/output, Interrupts. Programming the 8051 using Embedded C: Data Transfer and Logical Instructions, Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, Further Details on Interrupts.

UNIT: -II: Arm Architecture & Programming

ARM: The ARM architecture - ARM organization and implementation - The ARM instruction set - The thumb instruction set - Basic ARM Assembly language program - ARM CPU cores.

UNIT III: Real Time Operating System Concepts

Introduction to Real- Time Operating Systems: Tasks and Task States, Tasks and Data, Semaphores, and Shared Data; Message Queues,

Mailboxes and Pipes, Timer Functions, Events, Memory Management, Interrupt Routines in an RTOS Environment. An example RTOS likeuC-OS (Open Source);

UNIT –IV: Embedded Software Development Tools

Embedded Software Development Tools: Host and Target machines, Linker/Locators for Embedded Software, Getting Embedded Software into the Target System; Debugging Techniques: Testing on Host Machine, Using Laboratory Tools, An Example System.

UNIT V: Networks and Multiprocessors

Multiprocessor systems, distributed embedded systems, CAN bus, I2C bus, multiprocessor system-on-chip (MPSoC), accelerators.

Suggested Reading:

1. Wayne Wolf, "Computers and Components", Elsevier.
2. KennethJ.Ayala, "The8051 Microcontroller", Third Edition, , Thomson.
3. Muhammad Ali Mazidi, Janice Gillespie Mazidi, Rolin D. Mc Kinlay, The 8051 Microcontroller and Embedded Systems using Assembly and C, Second Edition, Pearson.
4. David E. Simon, "An Embedded Software Primer", Pearson Education
5. Raj Kamal, "Embedded Systems", Tata McGraw Hill.
6. FrankVahid, TonyGivargis, John Wiley, "Embedded System Design", Wiley Student Edition.
7. W.A. Smith, "ARM Microcontroller Interfacing: Hardware and Software, Eketor, 2010.
8. NPTEL Online Course on Microprocessors and Microcontrollers, Santanu Chattopadhyay.

SYLLABUS FOR B.E-VI SEMESTER
ADVANCED COMPUTER ARCHITECTURE
(Professional Elective-I: B.E. Semester-VI)

Instruction: 3 Hrs /week	SEE Marks :70	Course Code:PE610IT
Credits : 3	CIE Marks: 30	Duration of SEE: 3 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Understand the advanced architectural concepts that help in improving the processor performance.	1. Define the performance measurement of a computer system. 2. Apply the concepts of pipelining and superscalar techniques to improve the performance of a computer. 3. Apply the concept of vector processor in order to improve the performance of a computer. 4. Explain the use of array processors in improving the performance of a processor. 5. Explain the concepts of multi processor and multi computer architectures.

UNIT – I

Measuring Performance and Cost: Performance Measurement, Enhancement to Uniprocessor Models, Benchmarks, Basic Model of Advanced Computer Architectures.

UNIT – II

Pipelining and Superscalar Techniques: Basic Pipelining, Data and Control Hazards, Dynamic Instruction Scheduling, Branch Prediction Techniques, Performance Evaluation, Case Study-Sun Microsystems – Microprocessor.

UNIT – III

Vector Processors: Vector Processor Models, Vector Architecture and Design, Performance Evaluation, Programming Vector Processors.

UNIT – IV

Array Processors: Parallel Array Processor Model, Memory Organization, Interconnection, Networks: Performance Measures, Static and Dynamic Topologies.

UNIT - V

Multiprocessors and Multi Computers: Multiprocessor Models, Shared – Memory and Distributed Memory Architectures, Memory Organization, Cache Coherence and Synchronization Mechanisms, Parallel Computer, Performance Models.

Suggested Reading:

1. John. L. Hennessey and David A Patterson, " Computer Architecture - A Quantitative Approach", 4th Edition, Elsevier, 2007.
2. Sajjan G. Shiva, Taylor Series, " Advanced Computer Architecture", CRC Press, 2006.
3. Kai Hwang, "Advanced Computer Architecture ", McGraw Hill,

SYLLABUS FOR B.E-VI SEMESTER
ARTIFICIAL INTELLIGENCE
(Professional Elective-I: B.E. Semester-VI)

Instruction: 3 Hrs /week	SEE Marks :70	Course Code:**PE620IT**
Credits : 3	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:**
Gain generic problem solving skills that have applicability to a wide range of real-world problems.	1. Apply the basic principles, models, and algorithms of AI to recognize, model, and solve problems in the analysis and design of information systems. 2. Design AI functions and components involved in intelligent systems, such as computer games, expert systems, Artificial Neural Networks and semantic web. 3. Represent a natural language description as statements in logic and infer new facts from that knowledge. 4. Apply knowledge representation techniques to real-world problems 5. Apply probabilistic reasoning techniques to solve problems with noise, incomplete information, and uncertainty.

UNIT-I

Introduction to AI: Introduction, Intelligent Systems, Foundations of AI, Sub areas of AI, Applications.

Problem Solving - State-Space Search and Control Strategies: Introduction, General Problem Solving, Characteristics of Problem, Exhaustive Searches, Heuristic Search Techniques, Iterative-Deepening A*, Constraint Satisfaction

UNIT-II

Game Playing: Bounded Look-ahead Strategy and use of Evaluation Functions, Alpha-Beta Pruning.

Logic Concepts and Logic Programming: Introduction, Propositional Calculus, Propositional Logic, Natural Deduction System, Axiomatic System, Semantic Tableau System in Propositional Logic, Resolution Refutation in Propositional Logic, Predicate Logic, Logic Programming.

UNIT-III

Prolog Programming Language: Introduction, Prolog Program, Control Strategy of Prolog, Programming Techniques in Prolog.

Knowledge Representation: Introduction, Approaches to Knowledge Representation, Knowledge Representation using Semantic Network, Extended Semantic Networks for KR, Knowledge Representation using Frames.

UNIT-IV

Expert System and Applications: Introduction, Phases in Building Expert Systems, Expert System Architecture, Expert Systems vs Traditional Systems, Truth Maintenance Systems, Application of Expert Systems, List of Shells and Tools.

Uncertainty Measure - Probability Theory: Introduction, Probability Theory, Bayesian Belief Networks, Certainty Factor Theory, Dempster-Shafer Theory.

UNIT-V

Artificial Neural Networks: Introduction, Artificial Neural Networks, Single-Layer Feed-Forward Networks, Multi-Layer Feed-Forward Networks, Radial-Basis Function Networks, Design Issues of Artificial Neural Networks, Recurrent Networks.

Learning Resources:

1. Saroj Kaushik, Artificial Intelligence. Cengage Learning, 2011.
2. Russell, Norvig, Artificial intelligence, A Modern Approach, Pearson Education, Second Edition. 2004
3. Rich, Knight, Nair: Artificial intelligence, Tata McGraw Hill, Third Edition 2009.
4. http://www.nptelvideos.in/2012/11/artificial-intelligence.html

SYLLABUS FOR B.E-VI SEMESTER
DIGITAL SIGNAL PROCESSING
(Professional Elective-I: B.E. Semester-VI)

Instruction: 3 Hrs /week	SEE Marks :70	Course Code:**PE630IT**
Credits : 3	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:**
Understand various concepts of digital signal processing, design digital filters and analyse digital signal processor architectures.	1. Represent discrete time signals and systems in time domain. 2. Analyze discrete time signals and systems using the concepts of Z-Transform and Discrete Fourier Transform. 3. Design Finite Impulse Response FIR filters using windowing and optimum equiripple linear phase method for a given specification of the problem. 4. Design Infinite Impulse Response IIR filters using Impulse invariance, bilinear transformation method and also using analog methods like using Butterworth and Chebyshev methods with proper use of different transformation techniques, for a given specification of the problem. 5. Explain the architectural features of programmable digital signal processors and implement simple speech and image processing systems using TMS320c54XX processor.

UNIT-I

Basic Elements and advantages of DSP, Discrete time signals and systems, Analysis of discrete time LTI systems, Discrete time system described by difference equation. Review of Z-transforms, Frequency domain sampling, Properties of DFT, Overlap-save method, overlap-add method, Efficient computation of DFT: FFT Algorithm, Direct computation of DFT, Radix-2 FFT Algorithm, MATLAB program for FFT Calculation.

UNIT-II

Design of FIR filters, characteristics of practical frequency selective filters, symmetric and anti symmetric FIR filters. Design of linear face FIR filters using windows. Design of optimum equi-ripple linear face FIR filters. Structure for the realization of discrete time systems: structure for FIR systems, direct form and cascade form structures.

UNIT-III

Design of IIR filters from analog filters. IIR filter design by impulse invariance, bilinear transformation. Butterworth filters, Chebyshev filters. Frequency transformation in analog and digital domains.

Structures for IIR systems: direct form, cascade form, parallel form. Representation of numbers, Round off effect in digital filters.

UNIT-IV

Architectures for Programmable DSP devices: Introduction, basic architectural features, DSP computational Building Blocks (Multiplier, Shifter, MAC Unit & ALU). Bus Architecture & Memory: On-chip memory, organization of on-chip memory, Data Addressing capabilities: Immediate addressing mode, register addressing mode, direct addressing mode, indirect addressing mode and Special addressing modes. Address generation Unit, Programmability & Program execution: Program Control, Program Sequence. Speed issues: Hardware architecture, parallelism, pipelining. Introduction to TMS320C54xx DSP processor, Bus structure, CPU, Data Addressing modes, Memory space.

UNIT-V

Applications of Programmable DSP devices, DSP based Bio-telemetry receiver, A speech Processing System and its implementation of TMS320C54xx processor, An Image Processing System: JPEG Algorithm, Encoding & Decoding Using TMS320C54xx.

Learning Resources:

1. Proakis John G, Dimitris G. Manolakis, Digital Signal Processing, Third Edition, PHI 2005. (Units 1,2 &3).
2. Avtar Singh, S.Srinivasan, Digital Signal Processing Implementations Using DSP Microprocessors with Examples from TMS320C54xx, THOMSON BROOKS/COLE, 2004. (Units 4 & 5)
3. Jonathan (Y) Stein, Digital Signal Processing A Computer Science Perspective, WILEY-INDIA, 2000.
4. Vinay K. Ingle, John G. Proakis, Digital Signal Processing using MATLAB, THOMSON BROOKS/COLE, 2004.
5. Phil Lapsley, Jeff Bier, Amit Shoham, Edward Lee, DSP Processor Fundamentals: Architectures & Features, WILEY-INDIA, 1996.
6. http://www.nptelvideos.in/2012/11/digital-signal-processing.html

SYLLABUS FOR B.E-VI SEMESTER
NETWORK SECURITY
(Professional Elective-I: B.E. Semester-VI)

Instruction: 3 Hrs /week	SEE Marks :70	Course Code:**PE640IT**
Credits : 3	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:**
Understand OSI security architecture, Acquire fundamental knowledge on the concepts of finite fields and number theory, block cipher and models. Describe the principles of public key cryptosystems, hash functions and digital signature.	1. Describe the network security model and basics of number theory. 2. Compare various Cryptographic Techniques 3. Demonstrate the design Secure applications. 4. Devise and understand the various security practices. 5. Demonstrate web, communication and e-mail security

UNIT I:INTRODUCTION& NUMBER THEORY

Services, Mechanisms and attacks- the OSI security architecture- Network security model. FINITE FIELDS AND NUMBER THEORY: Groups, Rings, Fields-Modular arithmetic Euclid's algorithm-Finite fields- Polynomial Arithmetic –Prime numbers-Fermat's and Euler's theorem ,Testing for primality -The Chinese remainder theorem- Discrete logarithms.

UNIT II: BLOCK CIPHERS & PUBLIC KEY CRYPTOGRAPHY

Data Encryption Standard-Block cipher principles-block cipher modes of operation-Advanced Encryption Standard (AES)-Triple DES-Blowfish-RC5 algorithm. Public key cryptography: Principles of public key cryptosystems-The RSA algorithm-Key management - Diffie Hellman Key exchange ,Elliptic curve arithmetic-Elliptic curve cryptography.

UNIT III :HASH FUNCTIONS AND DIGITAL SIGNATURES

Authentication requirement – Authentication function – MAC – Hash function – Security of hash function and MAC –MD5 - SHA - HMAC – CMAC - Digital signature and authentication protocols – DSS – EI Gamal.

UNIT IV: SECURITY PRACTICE & SYSTEM SECURITY

Authentication applications – Kerberos – X.509 Authentication services - Internet Firewalls for Trusted System: Roles of Firewalls – Firewall related

terminology- Types of Firewalls - Firewall designs - SET for E-Commerce Transactions. Intruder – Intrusion detection system – Virus and related threats – Countermeasures – Firewalls design principles – Trusted systems – Practical implementation of cryptography and security.

UNIT V: E-MAIL, IP & WEB SECURITY

E-mail Security: Security Services for E-mail-attacks possible through E-mail - establishing keys privacy-authentication of the source-Message Integrity-Non-repudiation-Pretty Good Privacy-S/MIME. IPSecurity: Overview of IPSec - IP and IPv6-Authentication Header-Encapsulation Security Payload (ESP)-Internet Key Exchange (Phases of IKE, ISAKMP/IKE Encoding). Web Security: SSL/TLS Basic Protocol-computing the keys-client authentication-PKI as deployed by SSLAttacks fixed in v3-Exportability-Encoding-Secure Electronic Transaction (SET).

Learning Resources:

1. William Stallings, Cryptography and Network Security, 6 th Edition, Pearson Education, March 2013. (UNIT I,II,III,IV).
2. Charlie Kaufman, Radia Perlman and Mike Speciner, "Network Security", Prentice Hall of India, 2002. (UNIT V).
3. Behrouz A. Ferouzan, "Cryptography & Network Security", Tata Mc Graw Hill, 2007.
4. Man Young Rhee, "Internet Security: Cryptographic Principles", "Algorithms and Protocols", Wiley Publications, 2003.
5. http://www.nptelvideos.in/2012/11/cryptography-and-network-security.html

SYLLABUS FOR B.E-VI SEMESTER

DATA MINING

(Professional Elective-I: B.E. Semester-VI)

Instruction: 3 Hrs /week	SEE Marks :70	Course Code:**PE650IT**
Credits : 3	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:**
Highlighting the importance of Data Mining concepts and techniques for uncovering interesting data patterns hidden in large data sets.	1. Preform data cleaning, summarization, integration, transformation on the data using various data preprocessing techniques. 2. Apply various kinds of frequent mining methods to generate strong association rules. 3. Compare and classify the data and evaluate the accuracy of classifier and predictor. 4. Do the cluster analysis using various clustering techniques and identify and eliminate the outliers from large data bases. 5. Perform mining on spatial data, multimedia data, text data, and World Wide Web data.

UNIT – I

Introduction: What is Data Mining, Data Mining Functionalities, Classification of Data Mining Systems, and Major Issues in Data Mining.

Data Pre-processing: Pre-processing, Descriptive Data Summarization, Data Cleaning, Data Integration and Transformation, Data Reduction, Data Discretization and Concept Hierarchy Generation.

UNIT – II

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture and Implementation, from Data Warehousing to Data Mining.

Mining Frequent Patterns, Associations Rules: Basic Concepts, Efficient and Scalable Frequent Item Set Mining Methods, Mining various kinds of Association Rules.

UNIT – III

Classification and Prediction: Introduction, Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, and Rule based Classification, Classification by Back Propagation, Associative classification, Prediction, and Evaluate the Accuracy of a Classifier and Predictor.

UNIT – IV

Cluster Analysis: Introduction, Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Hierarchical Methods, Density-Based Methods, Grid Based Methods, Model Based Clustering Methods, and Outlier Analysis.

UNIT – V

Mining Object, Spatial, Multimedia, Text, and Web Data: Spatial Data Mining, Multimedia Data Mining, Text Mining, and Mining the World Wide Web.

Learning Resources :

1. Han J &Kamber M, Data Mining: Concepts and Techniques, Third Edition, Elsiver, 2011.
2. Pang-Ning Tan, Michael Steinback, Vipin Kumar, Introduction to Data Mining, Pearson Education, 2008.
3. Arun K Pujari, Data mining Techniques, Second Edition, University Press,2001.
4. Margaret H Dunham, S.Sridhar, Data mining: Introductory and Advanced Topics, Pearson Education, 2008.
5. Humphires, Hawkins, Dy, Data Warehousing: Architecture and Implementation, Pearson Education, 2009.
6. Anahory, Murray, Data Warehousing in the Real World, Pearson Education, 2008.
7. Kargupta, Joshi,etc., Data Mining: Next Generation Challenges and Future Directions, Prentice Hall of India Pvt Ltd, 2007.
8. http://freevideolectures.com/Course/2280/Database-Design/35
9. http://freevideolectures.com/Course/2668/Database-Management-System/31
10. http://nptel.ac.in/syllabus/syllabus_pdf/106106105.pdf

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
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 1. Critical and Non-verbal reasoning 2. Pure Maths 3. Verbal ability 4. Logical reasoning 5. Data Interpretation and Analysis	**At the end of the course, students will be able to:** 1. Understand the fundamentals concepts of Aptitude and verbal skills 2. Solve questions using short cuts and smart methods 3. Perform calculations with speed and accuracy 4. 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

SYLLABUS FOR B.E-VI SEMESTER
FINISHING SCHOOL – IV : TECHNICAL SKILLS
Fundamental Programming Skills
(For all branches of Engineering)

Instruction: 2 Hrs /week	SEE Marks :35	Course Code :**MC610IT**
Credits : 1	CIE Marks: 15	Duration of SEE : 3 Hrs

UNIT – I

Fundamentals of Programming

Fundamentals of programming through C–structure of a C program–compilation and linking processes –Constants, Variables–Tokens–Data Types–Format Specifiers, Input and Output statements– operators-Expression evaluation in C – Type qualifiers – Type Modifiers– Typedef
Branching–if, if-else, else-if ladder, nest edif, switch and go to statements -Loops–while, do- while, for statements
Practice: problems on data formats, operator's precedence and associativity, basic Conditional programs and Pattern display programs.

Arrays, Strings, Pointers,

Arrays –Initialization–Declaration–One dimensional, Two dimensional and Multi-dimensional arrays. Strings–Operations on strings, string functions
Pointers–Introduction to Program Memory, storage of data, Run time memory allocation– Pointer Arithmetic-Pointer to an Array–pointer to linear data, run time array, pointer to 2D- array.
Practice: problems on RMO and CMO representations of an array, spiral display of a 2D array and matrix operations

Functions, Recursions and Storage Classes

Functions–Introduction to modular programming–Function Communication -Pass by value, Pass by reference–Function pointers– Recursions–Typecasting–Storage classes
Practice: programs on passing an array and catching by a pointer, function returning data, comparison between recursive and Iterative solutions

UNIT – II

Structures, Unions, Enumerations Pre-processor Directives

Need for user-defined datatype–structure definition–Structure declaration–Array within a Structure–ArrayofStructures–NestedStructures-Unions–DeclarationofUniondatatype, Struct Vs Union- Enum–Pre-processor directives

Practice: Structure padding, user-defined data storage and retrieval programs

File Storage and OOP

Pre-Processor Directives, Introduction to Standard Storage, Types of Files, opening and closing a file, I/O operations on a File, File handling functions.

Procedure vs. object oriented programming –Datatypes–control structures–Operator Overloading–Inheritance–Polymorphism and Virtual Functions, Function templates and class templates –Namespaces–Casting–Exception Handling, Stream classes–Formatted IO–File classes and File operations–Dynamic memory allocation–Standard Template Library

Practice: I/O through files, class and object, Implementation of OOP concepts

SYLLABUS FOR B.E-VI SEMESTER
FINISHING SCHOOL – IV : TECHNICAL SKILLS
ADVANCEDPROGRAMMING SKILLS (CSE,IT)

Instruction: 2 Hrs /week	SEE Marks :35	Course Code :**MC620IT**
Credits : 1	CIE Marks: 15	Duration of SEE : 3 Hrs

UNIT – I

Linked Lists, Stacks and Queues

Introduction to Linked Lists, Operations on a Linked List-Doubly Linked List–Circular Linked List-Stack–Introduction to stack data structure, Stack operations, Infix, Prefix and Postfix evaluations, Stack using Array and Linked list -Queue–Introduction to Queue, Queue operations, Queue using an Array and Linked list

Time Complexity, Searching and Sorting

Asymptotic Notations, Evaluating the runtime complexity–Space Complexity -Linear search Vs Binary search–Sorting– Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort.

UNIT – II

Non-Linear Data Structures

Non-Linear Data Structures–Introduction to multi-linked data, Binary tree, Operations on a binary tree, tree traversal methods, Binary search tree, AVL Trees, Introduction to TRIE data structure. Introduction to Algorithmic approach. Designing algorithms for problem solving. Divide and Conquer methods–String Algorithms

Suggested Reading:

1. Ellis Horowitz, Sartaj Sahni and Susan Anderson-Freed, Fundamentals of Data Structures in C, 2/e, Universities Press, 2008
2. Mark Allen Weiss, —Data Structures and Algorithm Analysis in C, Second Edition, Pearson Education, 1996
3. Seymour Lipschutz, Data Structures with C, McGraw Hill, 2011
4. Robert Kruse, C.L.Tondo, Bruce Leung, Shashi Mogalla , — Data Structures and Program Design in C, Second Edition, Pearson Education, 2007
5. Jean-Paul Tremblay, Paul G. Sorenson, 'An Introduction to Data Structures with Application', TMH, 2nd Edition.
6. Richard F, Gilberg, B.A. Forouzan, "Data Structures, A Pseudocode Approach with C", Cengage, 2nd Edition

Online Resources:

http://nptel.ac.in/courses/106106127/

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
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.	**At the end of the course, students will be able to:** 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 professionals 4. 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.

• Anger/ Depression • Fear • Agitation • Failure • Lethargy • Dishonesty	• Cruelty • Jealousy • Desire • Cheating • Pride • Greed • Lying

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
2. UPTU website, Http://www.uptu.ac.in
3. story of stuff, 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

SYLLABUS FOR B.E-VI SEMESTER
WEB TECHNOLOGIES LAB

Instruction : 2 Hrs/week	SEE Marks : 50	Course Code : PC611IT
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hours

Course Objective:	Course Outcomes:
The course will enable students to:	**At the end of the course student will be able to:**
Be familiar with static Web page design using HTML and style sheets, dynamic web page design using java script and server side scripting languages, and also Responsive web pages.	1. Design Web pages using HTML, CSS, java script. 2. Design Responsive web pages. 3. Write basic programs using Python programming. 4. Develop simple applications using servlet and JSP. 5. Develop an application to access database using PHP.

HTML:

- Creation of HTML Document using basic tags.
- Creation of Menu using ordered and unordered list and other options.
- Creation of web page using table tags and their attributes
- Creation of web page using frames.
- Creation of document using CSS.

JAVASCRIPT:

- Basic javascript programs using control statements, arrays and functions.
- Write a java script to validate the following fields in a registration page
  1. Name (should contains alphabets and the length should not be less than 6 characters)
  2. Password(should not be less than 6 characters)
  3. E-mail(should not contain invalid addresses)

ZURB FOUNDATION and TWITTER BOOTSTRAP (1 week).

- Design Responsive web pages.

PYTHON:

- Python Program to Make a Simple Calculator

- Python Program to Display Calendar
- Python Program to Sort Words in Alphabetic Order
- Python Program to Merge Mails
- Python Program to Find the Size (Resolution) of a Image

SERVLET &JSP:

- Develop a simple java Servlet application .
- Develop a simple JSP application.

PHP:

- Basic programs using PHP.
- Create tables in the database which contain the details of items (books in our case like Book name, Price, Quantity, Amount) of each category. Modify your catalogue page in such a way that you should connect to the database and extract data from the tables and display them in the catalogue page using PHP.

Suggested Reading:

1. "Internet & World Wide Web How to Program", 5/e, Paul J. Deitel, Harvey M. Deitel, Abbey Deitel,2012.

References:

- http://getbootstrap.com/
- http://foundation.zurb.com/

SYLLABUS FOR B.E-VI SEMESTER
COMPILER CONSTRUCTION LAB

Instruction : 2 Hrs/week	SEE Marks : 50	Course Code : PC621IT
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hours

Course Objectives	**Course Outcomes**
The course will enable the students to:	**At the end of the course student will be able to:**
Learn to implement the different Phases of compiler	1. Implement simple lexical analyzer 2. Generate predictive parsing table for a CFG 3. Apply Lex and Yacc tools to develop a scanner & parser 4. Implement LR parser 5. Implement Intermediate code generation for subset C language

LIST OF EXPERIMENTS

1. Implement lexical analyzer to recognize a few patterns in C. (Ex. identifiers, constants, comments, operators etc.)
2. Implementation of Lexical Analyzer using LEX tool
3. Implement "first" of a given context free grammar
4. Implement "follow" of a given context free grammar
5. Implement elimination of left recursion and left factoring algorithms for any given grammar and generate predictive parsing table.
6. Write a program for generating derivation sequence for a given terminal string using SLR parsing table.
7. Use LEX and YACC tool to implement Desktop Calculator.
8. Implementation of code generation
9. Implementation of code optimization techniques
10. Major assignment: Intermediate code generation for subset C language.

Suggested Reading:

1. Aho, Ravi Sethi, Monica S Lam,Ullman, Compilers-Principle, Techniques and Tools 2nd Edition ,Pearson,2002
2. John R Levine, Tony Mason, Dougn Broun, Lex and Yacc, Orielly, 2nd Edition,2009

SYLLABUS FOR B.E-VI SEMESTER
EMBEDDED SYSTEMS LAB

Instruction : 2 Hrs/week	SEE Marks : 50	Course Code : PC631IT
Credits : 1	CIE Marks: 25	Duration of SEE : 3 Hours

Course Objectives	Course Outcomes
The course will enable the students to:	**At the end of the course student will be able to:**
Learn the instruction set and interfacing techniques of ARM and 8051 microcontrollers and their usefulness in implementing real time embedded system applications.	1. Write Assembly language programs using ARM Microcontrollers 2. Write Assembly language programs using 8051 microcontroller. 3. Write Assembly language programs for interfacing different I/O devices. 4. Write programs for developing real time applications for embedded system using VxWorks.

A. Use of 8-bit and 32-bit Microcontrollers, (such as 8051 Microcontroller, ARM2148 / ARM2378, LPC 2141/42/44/46/48) Microcontroller and C compiler (Keil, Ride etc.) to:
   1. Interface Input-Output and other units such as: Relays, LEDs, LCDs, Switches, Keypads, Stepper Motors, Sensors, ADCs, Timers
   2. Demonstrate Communications: RS232, IIC and CAN protocols
   3. Develop Control Applications such as: Temperature Controller, Elevator Controller, Traffic Controller

B. Development and Porting of Real Time Applications on to Target machines such as Intel or other Computers using any RTOS

I. Understanding Real Time Concepts using any RTOS through Demonstration of:

1. Timing
2. Multi-Tasking
3. Semaphores
4. Message Queues
5. Round-Robin Task Scheduling
6. Preemptive Priority based Task Scheduling
7. Priority Inversion
8. Signals
9. Interrupt Service Routines

II. Application Development using any RTOS:

1. Any RTOS Booting
2. Application Development under any RTOS

OPEN ELECTIVES OFFERED BY VARIOUS DEPARTMENTS IN B.E- V and VI SEMESTER (2018-19)

Engineering Branches

Open Elective VI (Semester - VI)			
Dept.	**Title**	**Code**	**credits**
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
Objectives of this course are to:	*Upon the completion of this course the students will be expected to:*
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 1:

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 2:

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**
The objectives of the course are to	*Upon the completion of the course, students are expected to*
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)

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:
• Understand different Operating system Structures, Services and threading models	1. Differentiate Operating system structures to show thee valuation of an operating system 2. Analyze the role of an Operating system in executing tasks on a system 3. Distinguish single threaded and multi threaded models of execution 4. Compare 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:

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

Reference Books:

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

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

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

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
• Identify different issues involved in the design and implementation of a database system. • Understand transaction processing.	1. Identify the functional components of database management system. Create conceptual data model using Entity Relationship Diagram 2. Transform a conceptual data model into a relational model 3. Design database using normalization techniques 4. Apply 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.

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
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:** 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.

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
1. The student shall know the basics of Electronics for Automotive Applications, operation of various electronics modules 2. The student shall know the various transducers and sensors used in automotive environment 3. The student shall acquire good knowledge about various electronic modules	**At the end of the course, students will be able to:** 1. Appreciate the operation of various electronic modules, their functionality 2. Understand various functions of modules like EBD, ABS, cruise control etc 3. Understand the Advanced Driver Monitoring Systems (ADMS) and safety sensors in automotive environment 4. 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 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 Regarding :

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.	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, UttamK.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.	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

Learning Resources:

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	On completion of the course, the student will be able to: 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 values, 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 Histand& 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: 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. Er. Prem 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