SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
Syllabus for B.Tech CSE I year I Semester
English
Essential English Language Skills
(Common to all branches)

L	T	P/D	C
2	0	0	2

Course Code: 9HC01

Course Objectives:
1. Recognize and distinguish between different parts of speech
2. Learn the correct usage of articles in sentences
3. Write sentences using tenses
4. Identify when each punctuation marks is needed and its correct usage
5. Recognize the difference between direct and indirect speech and form statements in them
6. Understand the appropriate use of active and passive voice in certain context

Course Outcomes:
After completion of the course, the student will be able to:

1. Understand and demonstrate the use of diverse forms of vocabulary in their communication. [L2]
2. Recognize different grammatical structures and use the appropriate ones in their communication.[L1 & L3]
3. Develop effective reading skills by applying strategies to comprehend different types of texts. [L4 & L3]

Units

1. Vocabulary-1:
1.1 Root words
1.2 Synonyms and Antonyms
1.3 Homonyms, Homophones and Homographs
1.4 One word substitutes

2. Vocabulary-2
2.1 Idioms and Phrases
2.2 Confusables

3. Grammar-1
3.1 The Parts of Speech
3.2 Use of Articles
3.3 Omission of Articles

4. Grammar-2
4.1 Tenses
4.2 Prepositions
4.3 Concord

5. Reading & Writing

5.1 Techniques of Reading, Reading Comprehension

5.2 Kinds of Sentences

5.3 Punctuation

6. Writing-2

6.1 Voice – Active voice and Passive Voice

6.2 Speech-Direct & Reported Speech

6.3 Common errors in English

Suggested Reading & References:

1. Word Power Made Easy by Norman Lewis
2. English Grammar In Use: A Self Study Reference And Practice Book Intermediate Learners Book byRaymond Murphy
3. The Logic of English Words by Logophilia Education
4. English Vocabulary In Use Elementary Book With Ans And Cd-Rom by Felicity Odell (Second Edition)
5. Effective Technical Communicatioin by M. Ashraf Rizvi
6.Intermediate grammar usage and composition; M.L.Tickoo, A.E.Subramanian, P.R.Subramanyam;   OBS
7. An Interactive Grammar to Modern English by Shivendra K. Verma and HemalathaNagarajan, Frank Bros. & Co.

PO's	1	2	3	4	5	6	7	8	9	10	11	12
Level								M	M	H		

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
Syllabus for B.Tech CSE I year I Semester
Oral Communications Lab-1
(Common to all branches)

L	T	P/D	C
0	0	2	1

Course Code: 9HC61

Course Objectives:
1. Comprehend the basic tactics to communicate effectively and set a road map to achieve their communication goals.
2. Know the importance of pronunciation in effective communication and work on mitigating the MTI in their spoken English;
3. Communicate in proper tense with conviction and also frame and pose questions aptly.
4. Describe people, objects and situations, using appropriate vocabulary, phrases and sequencing of ideas.
5. Use the right English language expressions in varying real life contexts.
6. Develop skill of narration through listening and coordination of ideas.

Course Outcomes:
After completion of the course, the student will be able to:
1. Describe people, objects and situations using simple sentences with proper pronunciation. [L1]
2. Use apt expressions and narrate stories in simple sentences. [L3]

OC LAB (2 per week)

Unit 1: Communication Skills

Communication basics, essential elements of effective communication, barriers to communication, setting SMART communication goals.

Activities:
- Ice-breaking activities
- Personal Communication SWOT Analysis
- Communication Case Studies: The Terrible & The Terrific

Unit 2: Pronunciation Matters
Importance of pronunciation, neutralizing mother tongue interference (MTI).

Activities:
- Odd Word Out
- Minimal Pairs Masti
- Shadow reading

Unit 3: Use apt expressions in diverse situations

Self-introduction, Greetings, apologizing, complimenting, inviting, complaining etc.

Activity:
Role play in different contexts using the appropriate expressions

Unit 4:Mind your Tenses
Describing present and past habits, states, and events.
Talking about actions in progress, relating past to the present, talking about the future.
Framing questions. (confirmation/information questions)

Activities:
- Speaking activity on daily routine, how students spent their recent vacation, speaking about their childhood, speaking about future plans.
- Dumb Charades (Present/Past continuous - Present/ Past perfect)
- Guessing game (10/20 yes or no questions)

Unit 5: Hone your Describing skills
Describing people, objects, and situations

Activities:
- Picture descriptions.
- Guessing games - listening to the descriptions.
- Narrating memorable incidents from life.
- Describe your ideal world
- Once upon a time……

Unit 6: The Art of Storytelling
Story telling for career success, the basics of story telling
Activities:
- Building stories - chain activity.
- Story prompts activity.
- Narrate the story. (all the hints are given except linking words and tenses)

Suggested Reading & References:

1. "An Interactive Grammar of Modern English" by Shivendra K Verma and HemalathaNagarajan, Frank Bros. & Co.
2. "Skill Sutras" by JayashreeMohanraj, Prism Books Pvt. Ltd.
3. "Better English pronunciation" by J.D. Connor.
4. "Effective Communication" John Adair, Pan Macmillan Ltd.
5. "Body Language", by Allan Pease, Sudha Publications.
6. "Communicative English", by Hariprasad M. and Prakasam V, Neel Kamal Publications.

SREENIDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
Syllabus for B.Tech CSE I year II Semester
BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

Code: 9AC48

L	T	P	C
3	0	0	3

Course Objective:

To understand the basics of Electrical engineering concepts and applications

Course Outcomes:

After studying this course, the student will be able to

1. Apply the principles of electrical circuits and DC generation with basic equations.[L3]
2. Illustrate the working principles of DC and three phase AC motors.[L3]
3. Analyse the construction and working principles of diode, various transistors with applications.[L4]
4. Use numbering systems to solve Boolean expressions.[L3]

Unit – I: Fundamentals of Electrical Engineering and DC Machines:

Ohm's Law, Kirchhoff's Laws, types of sources, passive elements. Series parallel circuits, mesh and nodal analysis. Superposition, Reciprocity theorem.

DC Machines: Principle of operation of D.C generators, types, E.M.F equation. Principle of operation of D.C motors, Types motors, Torque equation, Losses and efficiency, simple problems on D.C Generators and motors.

Unit – II: Fundamentals of AC circuits:

AC voltage wave form and basic definitions: Peak Value, R.M.S. value, Average values, Form factor and Peak factor, 'j' operator, Analysis of single phase AC circuits series and parallel (Simple circuits). Three phase circuits – Star - delta connection, Relation between line and phase voltages / currents in a 3-phase Star-Delta balanced system.

Unit – III: Induction Motors and Instruments:

Concept of Faraday's laws, 3- phase induction motor working principle, operation and construction details.

Instruments: Introduction, classification of instruments, operating principles, essential features of measuring instruments, permanent magnet moving coil (PMMC) instruments, moving iron (MI) instruments.

UNIT IV-DIODE: Overview of Semiconductors, PN junction diode and Zener diode –Diode circuits: rectifiers (bridge type only), filters, clippers and clampers.

UNIT V- TRANSISTOR: BJT construction, operation, characteristics (CB, CE and CC configurations) and uses – JFET and MOSFET construction, operation, characteristics (CS configuration) and uses.

UNIT VI-DIGITAL ELECTRONICS: Number systems – binary codes –binary arithmetic - Boolean algebra, laws & theorems - simplification of Boolean expression using K maps - logic gates - implementation of Boolean expressions is using logic gates - standard forms of Boolean expression.

Text Books:

1. Basic Electrical Engineering –T.K. Nagesarkar and M.S. Sukhja, Oxford University Press.2nd edition.
2. Basic electrical Engineering – M.S. Naidu and S. Kamakshiah – TataMcGraw-Hill, 2005 edition.
3. Principles of Electronics - V.K.Mehta, S.Chand Publications, 2nd edition.

References:

1. Theory and problems of Basic electrical Engineering- D.P.Kotahari&I.J.Nagrath PHI.
Electronic Devices and Circuits, Millman & Halkias, TMH publications.

Syllabus for B.Tech II year II Semester

Computer Science and Engineering

Economics, Accountancy and Management Science

	L	**T**	**P/D**	**C**

Code: 8ZC01

L **T** **P/D** **C**

2 **0** **0** **2**

Prerequisite: NIL

Course Objective:

To make the students understand the concepts and principles of Economics at micro level and basic principles of Financial Accounting and Analysis, andalso functions of Management with Organizational Behavior which facilitate them in making better planning and decisions.

Course Outcomes:

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

1. Acquire the basics of Managerial Economics at Micro level, Demand analysis and production analysis in particular.
2. Expose on Cost concept, Revenues and Market structure and describe the concepts.
3. Understand the basic concepts of Accounting, Double entry system and Bookkeeping.
4. Interpret the concepts of Capital expenditure, Revenue expenditure and Final accounts ad their significance.
5. Identify knowledge and elaborate the basics of Management, its principles and various functions performed in organization.
6. Recognize various personality traits, perception, attitudes of individuals working in organization.

UNIT-1INTRODUCTION TO MANAGERIAL ECONOMICS:
Definition, Nature and scope of Managerial Economics, Macro Economics consumer's Equilibrium. Theory of Demand, Demand function, Determinants, exceptions - Price Elasticity of Demand and Demand forecasting. Theory of supply, Production function and Economies of scale.

UNIT- 2INTRODUCTION TO COST, REVENUE AND MARKET STRUCTURE:

Cost Analysis, types of costs, Revenue Analysis, Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems). Market structures: Types of competition, Features of Perfect competition, Monopoly, Monopolistic Competition and oligopolistic competition.

UNIT-3INTRODUCTIONT O FINANCIAL ACCOUNTING:

Meaning and Definition of Accounting, principles of Accounting, Double-Entry system of Accounting, Book Keeping, introduction to Journal, Ledger and its types, Introduction to Trial balance, problems and solutions of trial balance.

UNIT-4 INTRODUCTION TO FINAL ACCOUNTS:

Introduction to Final Accounts, Concepts of classifications of Revenue and Capital expenditures, Final accounts: Trading account, Profit and Loss Account, Balance sheet, Problems and solutions of Final accounts with adjustments.

UNIT-5 INTRODUCTION TO MANAGEMENT:
Management- Definitions, Fayol's principles of Management, Levels of Management, functions of management. Planning: types of planning, planning process; Organizing: Organizational Design and structure, staffing; Directing;, Controlling: Basic control process.

UNIT-6 INTRODUCTION TO ORGANIZATIONAL BEHAVIOR:
Definition, Nature and Scope, Perception – Perceptual selectivity and organization, -, Perceptual Distortions Attribution analysis Attribution theories, Johari Window and Transactional Analysis Personality and Attitudes, Determinants of personality Formation of Attitudes.

TEXTBOOKS:

1. A R Aryasri: Managerial Economics, Tata Mc Graw Hill
2. A R Aryasri: Management Science, Tata Mc Graw Hill

REFERENCE BOOKS:

1. S A Siddiqui & A S Siddiqui, Managerial Economics & Financial Analysis, New Age
2. Accountancy – I Tulasian Tata Mcgraw Hill Co
3. Koontz &Weihrich: Essentials of Management, 6/e, TMH, 2005

Computer Science and Engineering

Comprehensive Test and Viva- Voce- III

	L	T	P/D	C

Code: 8E378 **1 0 0 1**

Prerequisite: NIL

Course Objective:

Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year and 2nd year 1st Semester.

Course Outcomes:

At the end of this course the student will be

1. Assessed
the

Comprehensive Test and Viva Voce	**The subjects studied in the Semester concerned related to branches concerned and for placements**
B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

Allocation of marks :

*Comprehensive Test   : 70 marks

**Viva Voce   : 30 marks

Total   : 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 20 marks.

End Semester Examination for Comprehensive Test will be taken for 50 marks.

Total marks for Comprehensive Test will be 70.

**Average of best two of Mid Tests of Mid – I, Mid – II and Mid - III for Viva Voce will be taken for 10 marks.

End Semester Examination for Comprehensive Viva Voce shall be evaluated for 20 marks.

The total for Viva Voce will be 30.

Thus the total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.

The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

Computer Science and Engineering

	L	T	P/D	C
Comprehensive Test and Viva Voce - IV	**1**	**0**	**0**	**1**

Code: 8E479

Prerequisite: NIL

Course Objective:

Evaluate, Comprehend and Assess the concepts and knowledge gained in the Core Courses of 1st year and 2nd year.

Course	Comprehensive Test and Viva Voce	The subjects studied in the Semester concerned related to branches concerned and for placements

Outcomes:

At the end of this course the student will be

1. Asses the knowledge of the students in the Core and Elective subjects that they have studied till the completion of that academic year.

Two Mid tests, Two mid Viva voce, one External Comprehensive Test and one External Comprehensive Viva Voce.

B.Tech I year I semester	I semester
B.Tech I year II semester	I and II semester
B.Tech II year I semester	I, II and III semester
B.Tech II year II semester	I, II, III and IV semester

Allocation of marks:

*Comprehensive Test: 70 marks

**Viva Voce   : 30 marks

Total   : 100 marks

*Average of two best Mid Tests of Mid Test – I, Mid Test – II and Mid Test - III will be taken for 20 marks.

End Semester Examination for Comprehensive Test will be taken for 50 marks.

Total marks for Comprehensive Test will be 70.

**Average of best two of Mid Tests of Mid – I, Mid – II and Mid - III for Viva Voce will be taken for 10 marks.

End Semester Examination for Comprehensive Viva Voce shall be evaluated for 20 marks.

The total for Viva Voce will be 30.

Thus the total sessional marks in this subject of Comprehensive Test and Viva Voce will be : 30 for sessionals and 70 for End Semester examination.

The grand total of marks for the subject of Comprehensive Test and Viva Voce will be 100. The student has to secure 40% of marks i.e. 40 marks in sum total of 100 marks to be successful in the subject.

Syllabus for B.Tech II year I Semester

Computer Science and Engineering

Universal Human Values

	L	T	P/D	C
	2	1	0	3

Code: 8HC17

Prerequisite: NIL

COURSE OBJECTIVE:

1. Development of a holistic perspective based on self-exploration about themselves (human being), family, society and nature/existence.

 2. Understanding (or developing clarity) of the harmony in the human being, family, society and nature/existence

3. Strengthening of self-reflection.

4. Development of commitment and courage to act.

COURSE OUTCOMES:

1. This course also discusses their role in their family. It, very briefly, touches issues related to their role in the society and the nature, which needs to be discussed at length in one more semester for which the foundation course named as "H-102 Universal Human Values

2. Understanding Harmony is designed which may be covered in their III or IV semester. During the Induction Program, students would get an initial exposure to human values through Universal Human Values – I. This exposure is to be augmented by this compulsory full semester foundation course.

COURSE TOPICS: The course has 28 lectures and 14 practice sessions in 6 modules:

Module 1: Course Introduction - Need, Basic Guidelines, Content and Process for Value Education

1. Purpose and motivation for the course, recapitulation from Universal Human Values-I

2. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self-exploration

3. Continuous Happiness and Prosperity- A look at basic Human Aspirations

4. Right understanding, Relationship and Physical Facility- the basic requirements for fulfillment of aspirations of every human being with their correct priority

5. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario

6. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living with responsibility (living in relationship, harmony and co-existence) rather than as arbitrariness in choice based on liking-disliking.

Module 2: Understanding Harmony in the Human Being - Harmony in Myself!

7. Understanding human being as a co-existence of the sentient 'I' and the material 'Body'

8. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility

9. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer)

10. Understanding the characteristics and activities of 'I' and harmony in 'I'

11. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail

12. Programs to ensureSanyam and Health. Include practice sessions to discuss the role others have played in making material goods available to me. Identifying from one's own life. Differentiate between prosperity and accumulation. Discuss program for ensuring health vs dealing with disease.

Module 3: Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship

13. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness; Trust and Respect as the foundational values of relationship

14. Understanding the meaning of Trust; Difference between intention and competence

15. Understanding the meaning of Respect, Difference between respect and differentiation; the other salient values in relationship

16. Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals

17. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family.

Include practice sessions to reflect on relationships in family, hostel and institute as extended family, real life examples, teacher-student relationship, goal of education etc. Gratitude as a universal value in relationships. Discuss with scenarios. Elicit examples from students' lives.

Module 4: Understanding Harmony in the Nature and Existence - Whole existence as Coexistence

18. Understanding the harmony in the Nature

19. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature

20. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space

21. Holistic perception of harmony at all levels of existence.

Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.

Module 5: Implications of the above Holistic Understanding

22. Natural acceptance of human values

23. Definitiveness of Ethical Human Conduct

24. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order

Module 6: Harmony on Professional Ethics

25. Competence in professional ethics:

a.   Ability to utilize the professional competence for augmenting universal human order

b.   Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,

c.   Ability to identify and develop appropriate technologies and management patterns for above production systems.

26. Case studies of typical holistic technologies, management models and production systems

27. Strategy for transition from the present state to Universal Human Order:

a.   At the level of individual: as socially and ecologically responsible engineers, technologists and managers

b.   At the level of society: as mutually enriching institutions and organizations

28.   Sum up.

Include practice Exercises and Case Studies will be taken up in Practice (tutorial) Sessions eg. to discuss the conduct as an engineer or scientist etc.

Text Book

1.Human Values and Professional Ethics by R R Gaur, R Sangal, G P Bagaria, Excel Books, New Delhi, 2010 3.

Reference Books

1.Jeevan Vidya: EkParichaya, A Nagaraj, Jeevan Vidya Prakashan, Amarkantak, 1999.

2.Human Values, A.N. Tripathi, New Age Intl. Publishers, New Delhi, 2004. 3.The Story

  of Stuff (Book).

4.The Story of My Experiments with Truth - by Mohandas Karamchand Gandhi

5.Small is Beautiful - E. F Schumacher.

6.Slow is Beautiful - Cecile Andrews

7.Economy of Permanence - J C Kumarappa

8.Bharat Mein Angreji Raj - PanditSunderlal

9.Rediscovering India - by Dharampal

10.Hind Swaraj or Indian Home Rule - by Mohandas K. Gandhi

11.India Wins Freedom - Maulana Abdul Kalam Azad

12.Vivekananda - Romain Rolland (English)

13.Gandhi - Romain Rolland (English)

Syllabus for B. Tech. III Year I semester

Computer Science and Engineering

DATA COMMUNICATIONS AND NETWORKS

L	T	P/D	C
3	0	0	3

Code: 8EC05

Prerequisite: NIL

Course Objectives:
1. To Study in detail about various analog and digital modulation and demodulation techniques.

2. To have a thorough knowledge of various multiplexing schemes and Data communication protocols,
3. To Learn flow control, error control and access control mechanisms.
4. To Learn routing and congestion control algorithms, internet protocols.
5. To Understand Transport layer entities such as DNS and HTTP.

Course Outcomes:

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

1. Understand concepts of different networks, network models and transmission medias.
2. Classify various data conversion techniques and Multiplexing, Demultiplexing techniques.
3. Summarize the design issues of Datalink layer and solve problems on Error and Flow control.
4. Infer MAC layer protocols, various connecting devices, IP addressing concepts and design a network(using subnetting and supernetting techniques)
5. Analyze various routing algorithms and outline the concepts of Internet control protocols and congestion control techniques.
6. Recognize services and protocols of transport layer, application layer along with network security issues.

UNIT I

Introduction: Data Communications, Networks: Topologies,PAN,LAN,MAN,WAN. The Internet, Protocols and Standards. Network Models: The OSI Model, Layers in the OSI Model, TCP/IP Protocol Suite.

Physical layer & Media: Guided Media, Unguided Media.

UNIT II

Data and Signals: Analog and Digital, Digital Transmission: Digital-to-Digital Conversion, Analog-to-Digital Conversion, Analog Transmission, Digital-to-analog Conversion, Analog-to-analog Conversion. Bandwidth utilization: Multiplexing and Demultiplexing.

UNIT III

Switching: Circuit-Switched Networks, Packet Switching, Message Switching.

Data Link Layer: Services, Data Link Control, Framing, Flow and Error Control, Error Detection and Correction, CRC, Checksum, Hamming code , Sliding Window Protocols, HDLC, Point-to-Point Protocol.

UNIT-IV

MAC sub layer:MAC Address, Multiple Access Protocol, Aloha, CSMA Protocols, IEEE Standards, Standard Ethernet, Fast Ethernet, Gigabit Ethernet, IEEE 802.11.

Connecting Devices: Repeaters, Hubs, Bridges, Switches, Routers, Gateways.

Network Layer: Logical Addressing, IPv4, IPv6,Subnetting and Supernetting, Internetworking.

UNIT V

Datagram and Virtual-Circuit Networks, Forwarding and Routing, Routing Protocols: Flooding, Shortest path routing technique, Distance Vector routing, Count to Infinity problem, Link State routing, Hierarchical routing technique, Multicasting, Broadcasting.

Internet control protocols: ICMP, ARP, RARP, DHCP

Congestion Control: Congestion Control in virtual –circuits and Datagram Subnets,

Traffic Shaping: Leaky-Bucket and Token-Bucket Algorithms.

UNIT VI

Transport Layer: Transport Services, Connection establishment, Connection release and TCP and UDP protocols.

Application Layer: Domain Name System, Electronic Mail and File Transfer Protocol, WWW and HTTP, Simple Network Management Protocol (SNMP)

Security and Privacy: Security attacks and services.

TEXT BOOKS:

1. Computer Networks — Andrew S Tanenbaum, 4th Edition. Pearson   Education/PHI

2. Data Communications and Networking – Behrouz A. Forouzan. Third Edition TMH.

REFERENCE BOOKS :

1. An Engineering Approach to Computer Networks-S.Keshav, 2nd Edition,Pearson Education

2. Understanding communications and Networks, 3rd Edition, W.A. Shay,   Thomson

3. Data Communications, William Stallings, Seventh edition.

Syllabus for B. Tech III Year II semester

Computer Science and Engineering

ADVANCED COMPUTER NETWORKS

(Professional Elective –II)

L	**T**	**P**	**C**
3	**0**	**0**	**3**

Code: 8EC12

Prerequisite: Data Communications and Computer Networks

Course Objectives:

This course aims to provide advanced background on relevant computer networking topics to have a comprehensive and deep knowledge in computer networks.

Course Outcomes:

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

1. Appraise networking and Internet concepts and be familiar with OSI Model and TCP/IP model.
2. Detect networking errors learn correction techniques
3. Infer the role of protocols in networking and to analyze the services and features of the various layers in the protocol stack.
4. Differentiate Internet addressing IPv4 and IPv6 and Internet protocols
5. Conceptualize wireless networking and to Develop new protocols in networking
6. Design new virtual private networks

UNIT I Computer Networks and the Internet: Introduction toInternet and Network edge, The Network core, Access Networks and Physical media, ISPs and Internet Backbones, Delay and Loss in Packet-Switched Networks, History of Computer Networking and the Internet – **(Chapter 1) of T1.**

Foundation of Networking Models: 6-layer TCP/IP Model, 7-Layer OSI Model, Internet Protocols and Addressing, Equal-Sized Packets Model: ATM - **(Chapter 2) of T2**.

UNIT II The Link Layer and Local Area Networks: Link Layer: Introduction and Services, Error-Detection and Error-Correction techniques, Multiple Access Protocols, Link Layer Addressing, And Ethernet – **(Chapter 6) of T1**

Unit – III Routing and Internetworking: Network–Layer Routing, Least-Cost-Path algorithms, Non-Least-Cost-Path algorithms, Intradomain Routing Protocols, Interdomain Routing Protocols, Congestion Control at Network Layer – **(Chapter 7) of T2**

UNIT IV Logical Addressing: IPv4 Addresses, IPv6 Addresses - **Internet Protocol:** Internetworking, IPv4, IPv6, Transition from IPv4 to IPv6 – **(Chapter 19, 20) of T3**

Transport and End-to-End Protocols: Transport Layer, Transmission Control Protocol (TCP), User Datagram Protocol (UDP), Mobile Transport Protocols, TCP Congestion Control – **(Chapter 8) of T2**

Application Layer: Principles of Network Applications, The Web and HTTP, File Transfer: FTP, Electronic Mail in the Internet, Domain Name System (DNS), P2P File Sharing – **(Chapter 2) of T1**

UNIT V Wireless Networks and Mobile IP: Infrastructure of Wireless Networks, Wireless LAN Technologies, IEEE 802.11 Wireless Standard, Cellular Networks, Mobile IP, Wireless Mesh Networks (WMNs) - **Mobile Ad-Hoc Networks:** Overview of Wireless Ad-Hoc Networks, Routing in Ad-Hoc Networks – **Wireless Sensor Networks** and Protocol Structures - **(Chapter 6, 19, 20) of T2**

UNIT VI VPNs, Tunneling and Overlay Networks: Virtual Private Networks (VPNs), Multiprotocol Label Switching (MPLS), Overlay Networks – **VoIP and Multimedia Networking:** Overview of IP Telephony – **(Chapters 16, 18) of T2**

TEXT BOOKS:

1. Computer Networking: A Top-Down Approach Featuring the Internet, James F. Kurose, Keith W.Ross, Third Edition, Pearson Education, 2007
2. Computer and Communication Networks, Nader F. Mir, Pearson Education, 2007

REFERENCES:

1. An Engineering Approach to Computer Networking , S.Keshav, Pearson Education, 1997
2. Computer Networks: Principles, Technologies And Protocols For Network Design, Natalia Olifer, Victor Olifer, Wiley India, 2006.
3. Computer Networks, Andrew S. Tanenbaum, Fourth Edition, Prentice Hall.

4. Fundamentals of Business Data Communications, Jerry FitzGerald and Alan Dennis, Tenth Edition, Wiley, 2009.
5. Campus Network Design Fundamentals, Diane Teare, Catherine Paquet, Pearson   Education (CISCO Press)
6. Data Communications and Networking, Behrouz A. Forouzan, Fourth Edition, Tata McGraw Hill, 2007

Syllabus for B. Tech III Year II semester

Computer Science and Engineering

DIGITAL FORENSICS

(Professional Elective –II)

L	T	P	C
3	0	0	3

Code: 8EC22

Prerequisite: Digital Electronics, Operating System, Computer Organization

Course Objectives:

1. To understand the basic digital forensics and techniques for conducting the forensic examination on different digital devices.
2. To understand how to examine digital evidences such as the data acquisition, identification analysis.

Course Outcomes:

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

1. OutlineForensicscienceandDigitalForensicconcepts
2. Comprehend the technical concepts involved in understanding the digital forensics.
3. Interpretthecyber piecesofevidence,Digitalforensicprocessmodel.
4. Familiarize the computer operating system concepts involved in digital forensics.
5. Determine the legalaspects of Digital Forensics.
6. Demonstratevariousforensictoolstoinvestigatethecybercrimeandto identifythedigital piecesof evidence

UNIT I: Introduction:
Understandingofforensicscience,digitalforensic,Thedigitalforensicprocess,Locard's Exchangeprinciple,scientificmodels.

UNIT II: Understandingofthetechnicalconcepts:
Basiccomputerorganization,Filesystem,Memoryorganizationconcept,Datastorageconcepts

UNIT III: DigitalForensicsProcessModel:
Introductiontocybercrimescene,Documentingthesceneandevidence,maintainingthe Chainofcustody,forensiccloningofevidence,Liveanddead systemforensic,Hashingconceptsto maintaintheintegrityofevidence, Reportdrafting.

UNIT IV: ComputerOperatingSystemArtifacts:
Findingdeleteddata,hibernatingfiles,examiningwindowregistry,recyclebinoperation,understandingofmetadata,Restore points andshadowcopies

UNIT V: Legalaspectsofdigitalforensics:
Understandingoflegal aspectsandtheirimpact ondigitalforensics,Electronicsdiscovery

UNIT VI: UnderstandingofdigitalForensictools
Qualityassurance,Toolvalidation,Toolselection,HardwareandSoftwaretools

CaseStudy:
UnderstandingofInternetresources,Webbrowser,Emailheaderforensic,social
Networkingsites

TextBooks:

1. ThebasicsofdigitalForensics(LatestEdition)–
   TheprimerforgettingstartedindigitalforensicsbyJohnSammons – ElsevierSyngressImprint

References:
1. Cybersecurity–Understandingofcybercrimes,computerforensicsandLegalperspectivesbyNinaGodboleand
   SunitBelapure – WileyIndia Publication
2. PracticalDigitalForensics–RichardBoddington[PACKT]Publication,Opensourcecommunity
3. https://nptel.ac.in/
4. https://www.coursera.org/
5. Ministry of Electronics and Information Technology (MeitY) – Govt of India – Information Security
   Project -https://www.infosecawareness.in/

Syllabus for B. Tech. III Year I semester

Computer Science and Engineering

BASICS OF INDIAN ECONOMY

(Open Elective –I)

	L	**T**	**P**	**C**
	2	**-**	**-**	**2**

Code: 8ZC25

Prerequisite: NIL

COURSE OBJECTIVES :

To provide basic knowledge relating to the Indian Economy thus making the students aware of the current aspects taking place in the Indian and world economy.

COURSE OUTCOMES :

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

1. Gain knowledge relating to Economics, various sectors and its growth
2. Will gain knowledge relating to various concepts of National income and related aggregates
3. Students will learn about Indian Industrial policy and benefits of LPG to India
4. Comprehend knowledge relating to Fiscal policy & Taxation system in India
5. Learn about inflation & business cycles.
6. Know about the BoP and its influence on economy.

Unit 1:Introduction to Economics: Definition, Economics and economy, back ground of economy, sectors of the economy, types of economy, growth of economy, primary moving force of Economic growth in India, mixed economy.

Unit 2: National Income and related aggregates: Aggregates related to National Income: Gross National Product (GNP), Net National Product (NNP), Gross and Net Domestic Product (GDP and NDP) - at market price, at factor cost; National Disposable Income (gross and net), Private Income, Personal Income and Personal Disposable Income; Real and Nominal GDP.

Unit 3: Industrial policy & Liberalization of Economy: Industrial policy in India, its objectives, Review of Industrial policies up to 1986, Industrial policy 1991 - causes of its implementation, benefits of Liberalization, privatization & Globalization to the Indian economy.

Unit 4: Fiscal policy & Taxation system: Fiscal policy- Definition, objectives, importance, setbacks, recent fiscal policy of India, Reforms to strengthen the fiscal policy in India. Taxation system in India, methods of taxation, a good tax system, VAT, GST, Reforms in taxation.

Unit 5: Inflation & Business Cycles: Inflation – Definition, types, effects of inflation on various segments of the population and sectors of the economy, measures to control inflation, Business cycles: Introduction, Depression, Recovery, Boom, and Recession.

Unit 6: Balance of Payments: Balance of payments account - meaning and components; balance of payments deficit-meaning. Foreign exchange rate - meaning of fixed and flexible rates and managed floating. Determination of exchange rate in a free market

Reference Books:
1. Indian Economy, Datt& Mahajan, 70th Edition, Sultan Chand publishers.
2. Indian Economy, Misra&Puri, 33rd Edition, Himalaya publishing house.
3. Latest Budget document by Ministry of Finance
4. Latest Economic survey
5. 12th Five year plan
6. News articles in The Hindu, The Business Line

Syllabus for B. Tech. III Year I semester

Computer Science and Engineering

Design Literacy and Design Thinking

(Open Elective –I)

L	T	P	C
2	-	-	2

Code: 8ZC08

Prerequisite: NIL

Course Objective:

The objective of the course is to make students understand the fundamental concepts of design thinking, and to familiarize with product design process and to motivate the students to ideate new products and services.

Course Outcomes:

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

1. Gain the knowledge on the inputs required for design thinking and also gain familiarity on concepts related to design thinking.
2. Understand the techniques of idea generation
3. Classify different phases of design thinking
4. Realize the product design process.
5. Understand design thinking for service design.
6. Gain knowledge on various cases related to design thinking.

Unit – I: Design Thinking – Introduction to Design thinking, Principles of design thinking, Benefits of design thinking, Applications of Design thinking, Social Innovation, Impact of Design thinking, Design thinking tools and techniques. Innovation and Design thinking.

Unit – II: Idea Generation: New Idea generation methods - Principles of Idea Generation, Techniques, Creativity thinking techniques and tools, types of creative thinking, select ideas from ideation methods.

Unit – III: Design Thinking Foundations: The Design Double Diamond: Discover-Define-Develop-Deliver, User-centric design approaches: Importance of user-centricity for design, Empathisation, Empathy Maps, Data collection from users and for users, Data Validation Responsible Innovation and Ethical Design:

Unit – IV: Product Design Process: Identification of opportunities, Problem Statement, Product planning, Characteristics of Successful product Development, New product development process, Stanford design thinking iterative model

Unit – V:Design Thinking for Service Design: Attributes of a good service design, service design tools – blueprint, customer journey mapping Identifying the user needs in a service-driven economy; Process Flows and Customer Experience considerations for designing and improving services; 5 Why"s; Service Delivery Pathways

Unit – VI: Case Studies on Design thinking: Case 1: Arcturus IV by John E.Arnold, Case – 2: How can we make AI to make things better for humans. Case – 3: User Centered Helmet Design by Prof. B.K. Chakravarthy- Part 1 and Part 2; Case – 4: Challenges of Reaching a Million Users by Prof. Chetan Solanki and Prof Jayendran V.

Text Books:

1. Brown, T. (2008). Design thinking. *Harvard business review*, *86*(6), 84.
2. "Innovation by Design", Gerald H. (Gus) Gaynor, AMACOM {American Management Association), NYC, 2002
3. Ansell, C., & Torfing, J. (2014). Collaboration and design: new tools for public innovation. In *Public innovation through collaboration and design* (pp. 19-36). Routledge.
4. Lewrick, M., & Link, P. (2015). Design thinking tools: Early insights accelerate marketers' success. *Marketing Review St. Gallen*, *32*(1), 40-51.

References Books:

1. Mæhlum, A. R. (2017). *Extending the TILES Toolkit-from Ideation to Prototyping* (Master's thesis, NTNU).
2. Norman, D. (2013). *The design of everyday things: Revised and expanded edition*. Basic books.
3. Design Thinking – A primer,Prof: Dr. Bala Ramadurai, Indian Institute of Technology, Madras.

Websites:
1. **www.smashingmagazine .com**
2. **www.IDEO.com**

Computer Science and Engineering

INTRODUCTION TO ADDITIVE MANUFACTURING PROCESS

(Open Elective –I)

L T P C

2 - - 2

Code: 8BC51

Prerequisite: NIL

COURSE OBJECTIVES:

To teach students the fundamental concepts of Additive Manufacturing, techniques involved and their advantages and limitations and various applications of these technologies in relevant fields such as mechanical, Bio-medical, Aerospace, electronics etc.

COURSE OUTCOMES:

1.Understand the Additive manufacturing processes and their relationship with subtractive manufacturing.

2. Demonstrate comprehensive knowledge of the broad range of liquid based rapid prototype processes, devices, capabilities and materials that are available.

3.Apply the principles of casting in Additive manufacturing processes

4. Articulate the various tradeoffs of Additive manufacturing software's/data format that must be made in selecting advanced/additive manufacturing processes, devices and materials to suit particular product requirements.

5. Learn various applications of additive manufacturing, such as in architecture art, health care direct part production and mass customization.

UNIT-I

Introduction:

Development of AM, Fundamentals of AM, Classification of AMS, Advantages, Standards on AM, Commonly used terms, AM process chain

UNIT-II Liquid-based Additive manufacturing Systems: Stereo lithography Apparatus (SLA), process, working principle, photopolymers, photo polymerization, Layering technology, laser and laser scanning, Applications, Advantages and Disadvantages, 3D bioprinting**Solid-based Additive manufacturingSystems:**, Laminated Object Manufacturing (LOM): process, working principle, Applications, Advantages and Disadvantages, Fused Deposition Modeling (FDM): working principle, Applications, Advantages and Disadvantages

UNIT-III

Powder Based Additive manufacturingSystems: Selective laser sintering (SLS): working principle, Applications, Advantages and Disadvantages, Color Jet printing, working principle, Applications, Advantages and Disadvantages, **Build time calculations –** SLA, FDM**,** Problems

UNIT-IV

Additive manufacturing Data Formats: STL Format, STL File Problems, Consequence of Building Valid and Invalid Tessellated Models, STL file Repairs: Generic Solution, Features of various AM software's like Magics, Mimics, Solid View, View Expert, 3 D View, Velocity 2, Rhino, STL View 3 Data Expert and 3 D doctor. **Design for AM** – Basic Principles and Practices

UNIT-V

Rapid Tooling: Introduction to Rapid Tooling (RT), Conventional Tooling Vs RT, Need for RT. Rapid Tooling Classification, Spray Metal Deposition, Silicone rubber molds, , Casting-Sand Casting ,Investment Casting,evaporative Casting

Reverse engineering – what is RE, Why use RE, RE Generic process, Overview of RE-Software and Hardware, CMMs-applications and types

UNIT-VI

Applications and examples : Application - Material Relationship, Application in Design, Application in Engineering, Analysis and Planning, Aerospace Industry, Automotive Industry, Jewelry Industry, Coin Industry, Arts and Architecture. Medical and Bioengineering Applications: Planning and simulation of complex surgery, Customized Implants and Prosthesis, Design and Production of Medical Devices, Bionic ear, dentistry

Text Books:

1.Chua C.K., Leong K.F. and LIM C.S, Rapid prototyping; Principles and Applications, World Scientific Publications , Third Edition, 2010.

2. Reverse Engineering: An Industrial Perspective, Springer- Verlag, 2008. ISBN: 978-1-84628-855-5

3. Ian_Gibson_· David_Rosen, Brent_Stucker, AdditiveManufacturingTechnologies3D Printing, Rapid Prototyping, andDirect Digital Manufacturing,Springer

4.PaulF.Jacobs, Rapid Prototyping and Manufacturing ASME Press, 1996.

L   T   P   C

PO	1	2	3	4	5	6	7	8	9	10	11	12
Level	M	M	M			L						

2   -   -   2

H: High, M: Medium, L: Low Correlation

Syllabus for B. Tech. III Year I semester

Computer Science and Engineering

EMBEDDED SYSTEMS

(Open Elective –I)

Code: 8DC42

Prerequisite: Computer Organisation

COURSE OBJECTIVES :

The constraints and challenges of an Embedded System design The 8051 Architecture, Assembly Language Programming , Interfacing and Interrupt handling mechanism Modern Embedded System Design case studies

COURSE OUTCOMES :

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

1. Classify embedded systems and their applications
2. Write ALP for 8051 architecture
3. Implement interfaces for Embedded System using various protocols and hardware modules.
4. Understand the principles of Communication Interface, Wireless and Mobile Systems Protocols
5. Design the interrupt routines for variois OS concepts and Memory Management techniques in an RTOS Environment
6. Recognize the issues and design of basic Real-Time Operating System principles, Semaphores and Queues, Hard Real-Time Scheduling Considerations.

UNIT – I: Introduction to Embedded Systems: Embedded Systems, Comparing Embedded and General Computing, Complex System Design and Processors, Classification of Embedded Systems, Embedded System Design Process, Formalization of System Design, Embedded SOC and VLSI Circuit Technology, Application examples of Embedded Systems.

UNIT – II: 8051 Architecture, Memory Organization and Programming: 8051 Architecture, features, Addressing modes, Instruction set, Input/output Ports and Circuits, External Memory, Counter and Timers, Serial data, Input/Output, Interrupts; The Assembly Language programming Process, Programming the 8051, Data Transfer and Logical Instructions. Arithmetic Operations, Decimal Arithmetic. Jump and Call Instructions, use of C programming for 8051.

UNIT – III: 8051 Real World Interfacing: Part A - Real World Interfacing, Performance metrics, Memory map, Processor and Memory selection, Part B - IO Subsystem, Sensors and Actuators, LED and LCD Interfacing, Keyboard Interfacing, Stepper Motor Interfacing, DC motor Interfacing Using PWM

UNIT – IV: Embedded Communication Interface: Serial and Parallel Communication, Timer and Counting Devices, Watchdog Timer, Real Time Clock, I^2C, SPI protocol, ISA , PCI, Internet Enabled Systems, Wireless and Mobile Systems Protocols

UNIT – V: 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. (Chapter 6 and 7 from Text Book 3, SImon).

UNIT – VI: Basic Design Using a Real-Time Operating System: Principles, Semaphores and Queues, HardReal-Tjme Scheduling Considerations, Saving Memory and Power, An example RTOS like uC-OS (Open Source); **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. (Chapter 8,9,10 & 11 from Text Book 3, Simon).

TEXT BOOKS:

1. Embedded Systems- Architecture, Programming and Design 2E, Raj Kamal, TMH
2. Introduction to Embedded Systems, K.Shibu, Tata McGraw-Hill
3. The 8051 Microcontroller and Embedded Systems Using Assembly and C – Mazidi, Pearson Education India, 2nd edition, 2008.
4. An Embedded Software Primer, David E. Simon, Pearson Education

REFERENCES:

1. An Embedded Software Primer, David E. Simon, Pearson Education.
2. Computers and Components: principles of embedded computing system design, Wayne Wolf, Elsevier.
3. 8051 Application Notes by Atmel.

L T P C

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Syllabus for B. Tech. III Year II semester

Computer Science and Engineering

BASICS OF POLITY AND ECOLOGY

(Open Elective –II)

Code: 8ZC26

Prerequisite: NIL

COURSE OBJECTIVE :

To provide basic knowledge relating to the Indian Polity and Ecology, thus making the students appreciate the current aspects related to both polity and ecology.

COURSE OUTCOMES :

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

1. Outline knowledge relating to the Indian Constitution and the Preamble to the Constitution.
2. Relate to the fundamental rights and duties of the Indian citizens and the directive principles of state policy.
3. Identify about the federal structure and judiciary of India.
4. Understand knowledge relating to the conservation of the environment.
5. Analyse about bio-diversity and climatic changes occurring in the environment.
6. Discuss about the international treaties, conventions and organizations active in the field of environmental protection.

Unit 1: Introduction to Salient Features of Constitution Significance of the Constitution, Distinction between Written and Unwritten Constitution, Composition of the Constituent Assembly and the role and objectives of the Drafting Committee, Main features and the nature of the Constitution of India. Preamble to the Constitution and its relevance; Basic principles of Preamble and their reflection in the constitutional provisions.

Unit 2: Fundamental Rights, Duties and Directive Principles of State Policy Fundamental Rights and Duties of Citizens- Importance of Rights and Duties, Dignity of an individual, Safeguards against deprivation of life and personal liberty; Writs for the protection of Fundamental Rights; Meaning of Directive Principles of State Policy, Classification of the Directive Principles, Role of Directive Principles, Role of Directive Principles in the establishment of economic and social democracy.

Unit 3: Government and Judiciary Legislative, financial and judicial powers of the President; Appointment of Prime Minister and constitution of Council of Ministers; Powers and functions of Prime Minister; Individual and collective responsibility; Powers and discretionary powers of the Governor; Appointment of the Chief Minister, Formation of the Council of Ministers; Powers and jurisdiction of the Supreme Court and High Courts of India.

Unit 4: Ecology and Environment Environment-Origin, Evolution of Environment and its uses by Humans; Degradation of Natural Environment, Principles of Ecology; Composition and various types of Ecosystem; International Solar Alliance.

Unit 5: Bio-diversity and Climate Change Classification of Biodiversity, Biodiversity loss, Methods of biodiversity conservation, Conservation of Natural Resources such as Soil, Land, Water and Energy. Sustainable Development and Cleaner Technology. Green house effect and Global Warming, Strategies to cope with Green House Effect, Desertification, Depletion of ozone layer.

Unit 6: International Treaties, Conventions & Organizations: Indian Board for Wildlife (IBW). United Nations Environmental Programme (UNEP), United Nations Framework Convention for Climate Change (UNFCCC). International Union for conservation of Nature and National Resources (IUCN), World Wide Fund for Nature (WWF).Montreal Protocol (1987), Kyoto Protocol (1997), Paris Agreement (2016).

REFERENCE BOOKS:
1. Indian Polity - M. Laxmikanth, 5th Edition, McGraw Hill Education, Chennai
2. Environment And Ecology A Complete Guide for Civil Services Preliminary and Main Examinations – R. Rajgopalan, 2017, Oakbridge Publishing Pvt. Limited.
3. Introduction to Constitution of India – Dr. Durga Das Basu, 22nd Edition, 2015, LexisNexis
4. Our Constitution – Subhash C Kashyap, 5th Edition, 2015, National Book Trust, India

5. Environment and Ecology – Anil Kumar De and Arnab Kumar De, 2009, New Age International (P) Limited.
6. ICSE Environment Education for Class X – Dr. M.P. Mishra , 2009, S.Chand and Company

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Syllabus for B. Tech. III Year II semester

Computer Science and Engineering

CO – CREATION AND PRODUCT DESIGN
(Open Elective –II)

Code: 8ZC09

Prerequisite:

Course Objective:

The objective of the course is to make students understand the fundamental concepts of design thinking, and to familiarize with product design process and to motivate the students to ideate new products and services.

Course Outcomes:

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

1. Understand the inputs required for human centric design thinking the students learn the techniques of idea generation.

2. Explore the different phases of Ideation process.
3. Outline emerging technologies and understand 3d printing in manufacturing.
4. Indicate developments of prototypes.
5. Understand reverse engineering methods in product development.
6. Review the information on IPR, and patent application.

Unit – I: Human Centered Design: Understanding user and Customer perspectives, Identify insights and opportunities, Interviewing, User Experience design.Frame your design challenge**.**
Empathy tools and techniques.

Unit – II: Ideation Process: Articulation of Problem Statement, Visualizing Ideas, Communicating ideas and compelling story telling, Brainstorming, Divergent thinking in exploring solutions, 3- box thinking, 3-box framework and Box-3 ideation.

Unit – III: Emerging Technologies and Design: Emerging technologies, utilization and growth, Automation through Industry 4.0, IOT for Network and Intelligent world, efficient and effective manufacturing aided by Robotics, Custom manufacturing by Additive / 3D printing, Augmented reality for product and process.

Unit – IV: Prototyping: Introduction to Prototype, types of prototype, prototyping strategies, Design consideration in the five stages of the product life cycle. Prototype building by different engineering disciplines. Testing Solution and taking the solution to the users. Create a pitch for your design.

Unit – V:Reverse engineering in product development: Reversing engineering methods, identifying the bad features in a product, reduction in size and weight, usage of new materials,importance of ergonomics in product development, environmental considerations in design, and safety considerations in design.

Unit – VI: Intellectual Property Rights: Introduction to IPR, Patents – Types of Patents, elements of patentability, Patents registration Procedure, Patent office and Appellate Board, Rights and Duties of Patentee, Restoration of Lapsed patents.

Text Books:

1. Philip Kosky, Robert T. Balmer, William D. Keat, George Wise, "Exploring Engineering: An Introduction to Engineering and Design", 4th edition, Elsevier, 2016.
2. David Ralzman, "History of Modern Design", 2nd edition, Laurence King Publishing Ltd., 2010 3. An AVA Book, "Design Thinking", AVA Publishing, 2010.
3. Ingle, B. R. (2013). Design thinking for entrepreneurs and small businesses: Putting the power of design to work. Apress.
4. Norman, D. A. (2016). Living with complexity. MIT press.
5. Chapman, J. (2017). Routledge handbook of sustainable product design. Taylor & Francis.
6. Nithyananda, K.V. (2019), IPR, protection and Management, India, Cengage learning India.

Reference Books:

1. G. Pahl, W.Beitz, J. Feldhusen, KH Grote, "Engineering Design: A Systematic Approach", 3rd edition, Springer, 2007. 2. Tom Kelley, Jonathan Littman, "Ten Faces in Innovation", Currency Books, 2006.
2. Kumar, V. (2012). 101 design methods: A structured approach for driving innovation in your organization. John Wiley & Sons.
3. Chapman, J. (2012). Designers Visionaries and Other Stories: A Collection of Sustainable Design Essays. Taylor & Francis.
4. Garrett, J. J. (2010). The elements of user experience: user-centered design for the web and beyond. Pearson Education.
5. Neeraj, P. &Khusdeep, D (2014), IPR, India, IN: PHI Learning.

**Syllabus for B. Tech. IV Year I
semester Computer Science and
Engineering LINUX
PROGRAMMING**

Code:7F708

	L	T	P	C
Prerequisite:OperatingSystems	3	-	-	3

COURSEOBJECTIVES:

Course Objectives: To Induce working principles of Linux operating system, usage of File handlingutilities,Securitybyfilepermissions,processutilities,Diskutilities,Networkingutilities. To impart the shell responsibilities and meta-characters of it, control structures, shell interrupt processing,functions,debuggingshellscripts.Toimpartbasicsoffileconceptskernelsupportfor file, file structure and low-level I/O functions, system calls (file API's). Induce knowledge

regardingDirectorymanagementanditsAPI.Todemonstratebasicsofprocesscreation,execution
andsynchronizationmechanisms.Giveknowledgeregardingasignal,needforhavingthem, usage of various signals.To narrate the need for Inter Process Communication. Explore the possible mechanisms to implement System V APIs. To demonstrate the usage of Message queues. To incorporate implementation for semaphore API and shared memory API. To explain the need for using a basic Client-Server model.

COURSEOUTCOMES:

Attheendofthiscourse,thestudentswillbeableto

1. DescribethebasicLinuxcommands
2. WriteShellScripts
3. EnlistvariousSystemCallsinLinux
4. Classify varioussystemcallstohandletheprocessesandsignaltheprocess
5. Elaboratetheworking ofIPC
6. Demonstratethesignificanceof Semaphores forKernelsupport and simulate program using the same.

UNIT-I : Linux Utilities-File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking commands, Filters, Text processing utilities and Backup utilities, sed – scripts,operation,addresses,commands,applications,awk–execution,fieldsandrecords,scripts, operation,patterns,usingsystemcommands inawk.(Applications: Determiningwhat typesoffiles are present in a system, debugging issues with file accessibility, finding a process troubling for a taskanddiscardingfromitsexisting,Writeandextractnecessaryinformationfromhugetestfiles.)

UNIT–II Working with the Bourne again shell(bash): Introduction, shell responsibilities, pipes and input Redirection, output redirection, running a shell script, the shell as a programming language,shellmetacharacters,filenamesubstitution,shellvariables,commandsubstitution,shell commands, the environment, quoting, test command, control structures, arithmetic in shell, shell scriptexamples,interruptprocessing,functions,debuggingshellscripts.

(Applications: Writing shell scripts for automating most of the regular jobs, taking backup on regular basisand restoring thesame)

UNIT-III: Files: File Concept, File System Structure, I nodes, File Attributes, File types,   Library functions,thestandardI/OandformattedI/OinC,streamerrors,kernelsupportforfiles,System calls, file descriptors, low level file access – File structure related system calls(File APIs), file and record locking, file and directory management – Directory file APIs, Symbolic links & hard links. (Applications: write some system programs to interact with file system, developing small systemsoftwaresto work with filesanddevices, Developingprogram'sondirectory management system)

UNIT-IV: Process – Process concept, Kernel support for process, process attributes, process control - process creation, waiting for a process, process termination, zombie process, orphan process, Process APIs. Signals– Introduction to signals, Signal generation and handling, Kernel support for signals, Signal function, unreliable signals, reliable signals, kill, raise , alarm, pause, abort, sleep functions.

(Applications: Applications to find number of typical processes are under different context   and controllingtheminsynchronousmanner.Developuserdefinedmodulesforhandlingasignal and controlling several issues with signals.)

UNIT-V: Interprocess Communication: Introduction to IPC, Pipes, FIFOs, Introduction   to   three   typesofIPC-messagequeues, semaphoresandsharedmemory.MessageQueuesKernelsupportfor   messages,   Unix system V APIs for messages, client/server example.

(Applications: Developing applications complying with IPC mechanisms, Developing an application that exchanges a set of messages among different processes. Write a client server applicationtogowith anyconcurrentapproach)

UNIT- VI : Semaphores-Kernel support for semaphores, Unix system V APIs for semaphores. Shared Memory- Kernel support for shared memory, Unix system V APIs for shared memory, semaphore and shared memory example.

(Applications: Develop critical section handling mechanisms to deal with any real problems.
Buildingapplicationstoshareapieceofmemoryresourceamongprocessesconcurrently)

TEXTBOOKS:
1. UnixSystemProgramming usingC++,T.Chan,PHI.
2. UnixConceptsandApplications,4thEdition,SumitabhaDas,TMH,2006.
3. BeginningLinuxProgramming,4thEdition,N.Matthew,R.Stones,Wrox,Wiley India Edition,rp-2008

REFERENCES:
1. LinuxSystemProgramming,RobertLove,O'Reilly, SPD.
2. AdvancedProgrammingintheUnixenvironment,2ndEdition,W.R.Stevens, Pearson Education.
3. UnixNetworkProgramming,W.R.Stevens,PHI.
4. Unixfor programmersand users, 3rd Edition, Graham Glass, King Ables,Pearson Education

SyllabusforB.Tech.IVYearIsemester
Computer Science and Engineering
CYBER SECURITY
(MandatoryCourse)

	L	*T*	*P*	*C*
Code:7FC20	**2**	**-**	**-**	**-**

Prerequisite:NIL

COURSEOBJECTIVES:

- Tofamiliarizewithnetworksecurity,networksecuritythreats,securityservices,and countermeasures.
- TobeawareofcomputersecurityandInternetsecurity.
- Tostudythedefensivetechniquesagainsttheseattacks.
- Tofamiliarizewithcyberforensics.
- Tobeawareofcybercrimerelatedtomobileandlaptopetc.
- ToacquireknowledgerelatingtoCyberspace lawsand Cybercrimes.
- Tounderstandethicallawsofcomputerfordifferentcountries,Offencesunderthe CyberspaceandInternetinIndia.

COURSEOUTCOMES :

Attheendofthiscourse,thestudentswillbeableto
1. Understandcyber-attacks,typesofcybercrimes.
2. Realizetheimportanceofcybersecurityandvariousformsofcyberattacksand countermeasures.
3. Getfamiliarity ofcyberforensics.
4. Get familiar withobscenityand pornography in cyber space and understand the violation of Right of privacyon Internet.
5. AppraiseCyberlawsandalsohowtoprotectthemselfandultimatelytheentireInternet communityfromsuchattacks.
6. Elucidate the variouschapters oftheITAct2008,power ofCentral andStateGovernment tomakerulesunder ITAct2008.

UNIT-I:IntroductiontocyberSecurity
Introduction to Cyber Security: Basic Cyber SecurityConcepts, layers of security, Vulnerability, threat, Harmful acts, motive of attackers, active attacks, passive attacks, Software attacks, hardwareattacks,Spectrumofattacks,Taxonomyofvariousattacks,IPspoofing,Methodsof   defense,

Security Models, risk management, Cyber Threats-Cyber Warfare, Cyber Crime, Cyber terrorism, CyberEspionage, etc.,

UNIT-II:CyberForensics:

Introduction to cyber forensic, Historical background of Cyber forensics, Digital Forensics Science, The Need for Computer Forensics, Cyber Forensics and Digital evidence, Forensics AnalysisofEmail,DigitalForensicsLifecycle,ForensicsInvestigation,ChallengesinComputer Forensics,SpecialTechniquesforForensicsAuditing.

UNIT-III:Cybercrime:MobileandWirelessDevices:

Introduction, Proliferation of Mobile and Wireless Devices, Trends in Mobility, Credit card FraudsinMobileandWirelessComputingEra,SecurityChallengesPosedbyMobileDevices, RegistrySettingsforMobileDevices,AuthenticationserviceSecurity,AttacksonMobile/Cell Phones,MobileDevices:SecurityImplicationsforOrganizations,OrganizationalMeasuresfor Handling Mobile, Organizational Security Policies and Measures in Mobile Computing Era, Laptops and desktop.

UNIT-IV:CyberSecurity:OrganizationalImplications:

IntroductioncostofcybercrimesandIPRissues,webthreatsfororganizations,securityand privacyimplications,socialmediamarketing:securityrisksandperilsfororganizations,social computingand the associated challenges for organizations.

CybercrimeandCyberterrorism: Introduction,intellectualpropertyin thecyberspace,the ethicaldimensionofcybercrimesthepsychology,mindsetandskillsofhackersandothercyber criminals.

UNIT-V:PrivacyIssues:

BasicDataPrivacyConcepts:FundamentalConcepts,DataPrivacyAttacks,Datalinkingand profiling, privacypolicies and their specifications, privacypolicylanguages, privacyin different domains-medical, financial, etc.

UNIT-VI:CyberspaceandtheLaw&MiscellaneousprovisionsofITAct.

Introduction to Cyber Security Regulations, International Law. The INDIAN Cyberspace, NationalCyberSecurityPolicy.InternetGovernance–ChallengesandConstraints,Computer Criminals, CIA Triad, Assets and Threats.

OtheroffencesundertheInformationTechnologyActinIndia,TheroleofElectronicEvidence andmiscellaneousprovisionsoftheITAct.2008.

Cybercrime:ExamplesandMini-Cases

Examples:OfficialWebsiteofMaharashtraGovernmentHacked,IndianBanksLoseMillionsof Rupees,ParliamentAttack,PuneCityPoliceBustNigerianRacket,e-mailspoofinginstances.   Mini-Cases: The Indian Case of online Gambling, An Indian Case of Intellectual Property Crime, Financial Frauds in Cyber Domain.

TEXTBOOKS:
1. NinaGodboleandSunitBelpure,CyberSecurityUnderstandingCyberCrimes,Computer ForensicsandLegalPerspectives,Wiley
2. B.B.Gupta,D.P.Agrawal,HaoxiangWang,ComputerandCyberSecurity:Principles, Algorithm,

Applications, and Perspectives, CRC Press, ISBN 9780815371335, 2018.

REFERENCEBOOKS:

1. CyberSecurityEssentials,JamesGraham,RichardHowardandRyanOtson,CRCPress.
2. IntroductiontoCyberSecurity,Chwan-Hwa(john)Wu,J.DavidIrwin,CRCPressT&F Group.
3. DebbyRussellandSr.G.TGangemi,"ComputerSecurityBasics(Paperback)", 2ndEdition, O' Reilly Media, 2006.
4. WenboMao,"ModernCryptography–TheoryandPractice",PearsonEducation,New Delhi, 2006.
5. CyberspaceandCybersecurity,GeorgeKostopoulos,AuerbachPublications,2012.
6. CyberForensics:AFieldManualforCollecting,Examining,andPreservingEvidenceof Computer Crimes, Second Edition, Albert Marcella, Jr., Doug Menendez, Auerbach Publications, 2007.
7. CyberLawsandIT Protection, HarishChander, PHI, 2013

SyllabusforB.Tech.IVYearIsemester
Computer Science and Engineering

		L	*T*	*P*	*C*
LINUXPROGRAMMINGLAB		**0**	**0**	**3**	**1.5**

Code:7F777

Prerequisite:NIL

COURSEOBJECTIVES:

To make use of File handling utilities, Security by file permissions, process utilities, Disk utilities, Networking utilities. To understand meta-characters of BASH, acquire the knowledge regarding control structures, shell interrupt processing, functions, debugging shell scripts.. To impart usage of kernel supportforfilesusingC,understandfilestructureandlow-levelI/Ofunctions,systemcalls(fileAPI's). Induce knowledge regarding Directory management and its API.. To analyze syntaxes for process creation, execution and synchronization mechanisms. Giveknowledgeregarding asignal, need for having them,usageofvarioussignals.TounderstandthepossiblemechanismstoimplementSystemVAPIsand analyze theusageof Messagequeues APIs. To incorporate implementation forsemaphoreAPI and shared memoryAPI.ToexplaintheneedforusingabasicClient-Servermodel.

COURSEOUTCOMES :

Attheendofthiscourse,thestudentswillbeableto

1. TounderstandhowtoworkwithLinuxcommandsforhandlingfiles,processes,text utilities,backupandnetworkutilities.
2. ToexplorebasicsofbuildingshellscriptsgainknowledgetocomposevariousShell Scripts.
3. Tolearn anddemonstrate theI/O functions,low-levelsystemcallsSystem Callsavailable forfileanddirectoryhandling.
5. Togainknowledgeinimplementingprocessesaspects,masteringtheprocessAPIs.
6. Tounderstandhowtoimplementpipes,fifo,howtouseforcommunicationpurposein IPC.
7. TounderstandthesignificanceofSemaphoresforKernelsupportandsimulateprogram using the same.

ListofExperiments

1. BasicLinuxCommandsFilehandlingutilities,Securitybyfilepermissions,Process utilities, Disk utilities, sed, awk, grep.
2. Writeashellscriptthatacceptsafilename,startingandendinglinenumbersas argumentsanddisplaysallthelinesbetweenthegivenlinenumbers.

specified word in one or more files supplied as arguments to it.

4. Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

5. C programming examples using Linux Operating systems.
a) wc b) cat c) cp

6. Write a shell script that receives any number of filenames as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

1) Write the following Shell scripts:

a) To accepts a list of filenames as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

b) To list all of the directory files in a directory.

c) To find factorial of a given integer.

8. a) Write an awk script to count the number of lines in a file that do not contain vowels.
b) Write an awk script to find the number of characters, words and lines in a file.

9. Implement in C the following Unix commands using System calls a) rename b) link

10. Write a C program to emulate the Unix ls –l command.

11. Write a C program on zombie process

12. Write a C program that illustrates the following. a) Creating a message queue. b) Writing to a message queue. c) Reading from a message queue.

13. Write a C program that illustrates file locking using semaphores.

14. Write a C program to implement record locking.

15. Write a C program to implement data communication between two processes

3.   a

for B. Tech. IV Year I semester
Computer Science and Engineering
SUMMERINDUSTRYINTERNSHIP-II

	L	T	P	C
Prerequisite: AllCoursestillthissemester	-	-	-	1

COURSEOBJECTIVES:

Course Objectives: Toenhance theknowledgeon selectingaproject,learn relatedtoolsandenhance programmingandcommunicationskillsforemployability.

COURSEOUTCOMES :

Attheendofthiscourse,thestudentswillbeableto

1. Usetheconceptslearnedinthecourses,sofar,inconceptualizing,designingandexecutingthe modules of the projects.
2. Exhibittheinterestinlearningthemoderntoolsandtechnologiesthroughthebridgecourses arranged in thecollege, beyond thecurriculum, and hencedevelopingthesoftware.
3. Inculcateanenthusiasmtousethecreativeideastobuildtheinnovativeprojectswhichare meetingthecurrent needs of themarketandsocietyas awhole.
4. Improve theircommunicative skills andteamskillslargelyimprove.
5. Workasanindividualandinateam.

Asummerindustryinternshipprojectshallbecarriedoutbyagroupofstudentsconsistingof2to3in numberduringsummerfourthyearfirstsemesteratindustries.Thisworkshallbecarriedoutunderthe guidance of the faculty assignedas internalguide as wellas externalguideatindustry where students are carryingoutsummerindustryinternshipproject.Projectshallconsistofdesign,fabrication,software development or buildingofprototype. This can beof interdisciplinarynaturealso.

Therewill be 100 marks in total with 30 marksof internal evaluation and 70 marks of external The **internal evaluation** shall consist of:

Daytoday work(internalguide10M externalguide:5M)	:	15marks
Report	:	05marks
Demonstration/presentation (internalpresentation isevaluatedbyHOD,seniorfacultyandinternalguide)	:	10marks
		----------------
		30marks
Endexamination	:	70Marks.

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External Evaluation oftheproject (viva-voce) shall be conducted by a committeeappointed bythe Chief Superintendent. The end examination will be carried out by a committee consisting of an

external examiner,headofthedepartment,aseniorfacultymemberandthesupervisor.

Syllabus for B.ech. IV Year I semester	**L** **3**	**T** **-**	**P** **-**	**C** **3**

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Syllabus for B.ech. IV Year I semester

Computer Science and Engineering

BUSINESS INTELLIGENCE

(ProfessionalElective–IV)

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Prerequisite:NIL

COURSEOBJECTIVES:

Thestudentsshouldbeexposedwiththebasicrudimentsofbusinessintelligencesystem and the modeling aspects behind Business Intelligence. Understand of the business intelligence life cycle and the techniques used in it along with the different data analysis tools and techniques.

COURSEOUTCOMES:

Attheendofthiscourse,thestudentswillbeableto

1. Elaboratethefundamentalsofbusinessintelligence.
2. Linkdatamining withbusinessintelligence.
3. Applyvariousmodelingtechniques.
4. Performthedataanalysisandknowledgedeliverystages.
5. Applybusinessintelligencemethodstovarioussituations.
6. Decideonappropriatetechniquefor the given model.

UNITI

BUSINESSINTELLIGENCE

Effectiveandtimelydecisions–Data,informationandknowledge–
Roleofmathematicalmodels–
Businessintelligencearchitectures:Cycleofabusinessintelligenceanalysis–
Enablingfactors inbusiness intelligence projects – Development of a business intelligence system – Ethics and business intelligence.

UNITII

KNOWLEDGEDELIVERY

The business intelligence user types, Standard reports, Interactive Analysis and Ad HocQuerying, Parameterized Reports and Self-Service Reporting, dimensional analysis, Alerts/Notifications,

UNITIII

DATAVISUALIZATION

Visualization:Charts,Graphs,Widgets,ScorecardsandDashboards,Geographic Visualization,Integrated Analytics, Considerations: Optimizing the Presentation for the Right Message.

UNIT IV

EFFICIENCY

Efficiencymeasures–TheCCRmodel:Definitionoftargetobjectives-Peergroups–Identification ofgoodoperatingpractices;crossefficiencyanalysis–virtualinputs andoutputs–Other models. Pattern matching–cluster analysis,outlier analysis

UNITV

BUSINESSINTELLIGENCEAPPLICATIONS

Marketingmodels–LogisticandProductionmodels–Casestudies.

UNITVI

FUTUREOFBUSINESSINTELLIGENCE

Futureofbusinessintelligence– EmergingTechnologies,MachineLearning,PredictingtheFuture, BI Search & Text Analytics – Advanced Visualization – Rich Report, Future beyond Technology.

TEXTBOOK:

1. EfraimTurban,RameshSharda,DursunDelen,"DecisionSupportandBusinessIntel ligence Systems", 9 th Edition, Pearson 2013.

REFERENCES:

1. Larissa T. Moss, S. Atre, "Business Intelligence Roadmap: The Complete Project Lifecycle of Decision Making", Addison Wesley, 2003.
2. CarloVercellis,"BusinessIntelligence:DataMiningandOptimizationforDecision

Making", Wiley Publications, 2009.
3. DavidLoshinMorgan,Kaufman,"BusinessIntelligence:TheSavvyManager"sGui de", Second Edition, 2012.
4. CindiHowson,"SuccessfulBusinessIntelligence:SecretstoMakingBIaKillerApp ", McGraw- Hill, 2007.
5. RalphKimball,MargyRoss,WarrenThornthwaite,JoyMundy,BobBecker,"TheD ata Warehouse Lifecycle Toolkit", Wiley Publication Inc.,2007

Syllabus for B. Tech. IV Year I semester	**L**	**T**	**P**	**C**
	3	**-**	**-**	**3**
Computer Science and Engineering				
AUGMENTED AND VIRTUAL REALITY				

(ProfessionalElective–IV)

Prerequisite: ImageProcessing

COURSEOBJECTIVES:

This course provides students with an opportunity to explore the research issues in Augmented Reality and Virtual Reality (AR &VR). It also makes the students know the basic concept and framework of virtual reality.

COURSEOUTCOMES:

Attheendofthiscourse,thestudentswillbeableto

1. UnderstandthefundamentalsofVirtualReality.

2. ComprehendmultipleModelsofInputandOutputInterfaceinVirtualRealitylikeGloves , Video-based Input, 3D Menus & 3DScanner etc.

3. DescribethefundamentalsorAdvancedtopicsofComputerGraphics.

4. Explain the Interactive Techniques on VR in respect of Body Track, Hand Gesture, 3D Manus, Object Grasp.
5. KnowaboutthedevelopmentsToolsofVRanddescribe.

6. FamiliarizetheConceptualideaon Augmented Realityandrelatetheillustrations.

Unit1: Introduction of Virtual Reality:Fundamental Concept and Componentsof Virtual Reality. PrimaryFeaturesand Present Development on Virtual Reality.

Unit2: Multiple Models ofInput and Output InterfaceinVirtual Reality: Input -- Tracker,Sensor, Digital Glove, Movement Capture, Video-based Input, 3D Menus & 3DScanner etc. Output --Visual /Auditory / Haptic Devices.

Unit3: VisualComputationinVirtualReality:FundamentalsofComputerGraphics.Softwa reand Hardware Technology on Stereoscopic Display. Advanced Techniques in CG: Management of Large Scale Environments & Real Time Rendering.

Unit 4: Interactive Techniques in Virtual Reality: Body Track, Hand Gesture, 3D Manus, Object Grasp.

Unit 5: Development Tools and Frameworks in Virtual Reality: Frameworks of Software DevelopmentTools in VR. X3D Standard;Vega, MultiGen, Virtools etc. Application of VR inDigital Entertainment: VR Technology in Film & TV Production. VR Technology in Physical Exercises and Games. Demonstration of Digital Entertainment by VR.

Unit6: Augmentedand Mixed Reality, Taxonomy, technology and featuresof augmentedreality, difference between AR and VR, Challenges with AR, AR systems and functionality, Augmented reality methods, visualization techniques for augmented reality, wireless displays in educational augmentedrealityapplications,mobileprojectioninterfaces,marker-lesstrackingforaugmented reality, enhancing interactivity in AR environments, evaluating AR systems.

TEXTBOOKS:

1) Burdea,G.C.andP.Coffet.VirtualRealityTechnology,SecondEdition.Wiley-IEEEPress, 2003/2006.
2) AlanB.Craig,UnderstandingAugmentedReality,ConceptsandApplications,Morgan Kaufmann, 2013.

REFERENCEBOOK:

1)AlanCraig,WilliamShermanandJeffreyWill,DevelopingVirtualRealityApplications,
Foundations of Effective Design, Morgan Kaufmann, 2009**.**

Syllabus for B. Tech. IV Year II semester

Computer Science and Engineering

INTERNET OF THINGS

(ProfessionalElective–V)

L	T	P	C
3	-	-	3

Prerequisite: DataCommunications

Terminology, technology and applications of IoT IoT system management using M2M (machine to machine) with necessary protocols Python Scripting Language preferred for many IoT applications RaspberryPIasahardwareplatformforIoTsensorinterfacingImplementationofwebbasedservices for IoT with case studies

Attheendofthiscourse,thestudentswillbeableto

1. Getfamiliarwithterminology,technologyandapplicationsofIoT
2. UnderstandandexplainIoTsystemmanagementusingM2M(machinetomachine)withnecessary protocols
3. DesignanddevelopPythonScriptingLanguageprogramspreferredformanyIoTapplications
4. UseRaspberryPIasahardwareplatformfordesigningtheIoTsensorinterfacing
5. ImplementwebbasedservicesforIoT.
6. UnderstandandanalyzethecasestudiesillustratingIoTDesign

UNITI: Introductionto Internet of Things Definitionand Characteristicsof IoT,Physical Design of IoT – IoT Protocols, IoT communication models, IoT Communication APIs, IoT enabled Technologies like Wireless Sensor Networks, Cloud Computing, Big data analytics, and Communication protocols, Embedded Systems, IoT Levels and Templates.

UNITII:IoTandM2MSoftwaredefinednetworks,networkfunctionvirtualization,differencebetween SDN and NFV for IoT; Basics of IoT System Management with NETCOZF-YANG (Block Diagrams).

UNIT III: Developing IoT IoT Design Methodology – The 10 steps design methodology; Logical design usingPython:IntroductiontoPython-LanguagefeaturesofPython,Datatypes,datastructures,Control of flow,functions,modules,packaging,filehandling,date/timeoperations,Python packagesofinterest for IoT.

UNIT IV: IoT Physical Devices and End pointsRaspberry PI – Introduction to Raspberry PI and its Interfaces(serial,SPI,I2C)Programming–PythonprogrammingwithRaspberryPI–ControllingInput/ output (Interfacing with LED and LDR).

UNIT V: IoT Physical Servers and Cloud Offerings Cloud concepts (IaaS, PaaS, Saas), Introduction to Cloud Storage models and communication APIs – WAMP, Xively; Python web application framework with Django, Designing a RESTful web API

UNIT VI: Case Studies Illustrating IoT Design Home Automation – Smart Lighting, Home intrusion detection, Cities – Smart parking, Environment – Weathermonitoringsystem, Weather reporting bot, Air pollution monitoring, Forest fire detection, Agriculture– Smart irrigation, Productivity applications– IoT printer

TEXTBOOKS:

1. InternetofThings-AHands-onApproach,ArshdeepBahgaandVijayMadisetti,Universities Press, 2015, ISBN: 9788173719547
2. GettingStartedwithRaspberryPi,MattRichardson&ShawnWallace,O'Reilly(SPD),2014, ISBN: 9789350239759