PROGRAM STRUCTURE
AND
DETAILED SYLLABUS (Volume-II)

COMPUTER SCIENCE AND ENGINEERING

FOR

CBCS BASED B.TECH – FOUR YEAR DEGREE PROGRAM
(Applicable for the batches admitted from AY 2016-17)

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY
(Autonomous)
Cheeryal (V), Keesara (M), Medchal Dist., Pin Code: 501 301

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)

(Approved by AICTE, Permanently Affiliated to JNTUH, Accredited by NAAC with 'A' Grade)

Cheeryal (V), Keesara (M), Medchal Dist., Telangana - 501 301

B.Tech. COMPUTER SCIENCE AND ENGINEERING

Academic Regulations: AR-16 **Academic Year 2016-17**

PROGRAM STRUCTURE

FIRST YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16EN1101	English-I	HS	2	-	-	30	70	100	2
2	16PH1101	Engineering Physics	BS	3	1	-	30	70	100	3
3	16MA1101	Mathematics – I	BS	4	1	-	30	70	100	4
4	16CH1101	Engineering Chemistry	BS	3	-	-	30	70	100	3
5	16CS1101	Computer Programming-I	ES	3	-	-	30	70	100	3
6	16ME1101	Engineering Drawing	ES	2	-	3	30	70	100	4
7	16EN11L1	English - I Lab	HS	-	-	2	30	70	100	1
8	16CH11L1	Engineering Chemistry Lab	BS	-	-	3	30	70	100	2
9	16CS11L1	Computer Programming - I Lab	ES	-	-	3	30	70	100	2
Total				**17**	**2**	**11**	**270**	**630**	**900**	**24**
Total Periods Per Week				**30**						

Abbreviation	Description
HS	Humanities and Social Sciences
BS	Basic Sciences
ES	Engineering Sciences
PC	Professional Core
SC	Soft Core
CC	Core Course
PE	Professional Elective
OE	Open Elective

Abbreviation	Description
L	Lecture
T	Tutorial
P	Practical
D	Drawing
CIE	Continuous Internal Evaluation
SEE	Semester End Examination
Tot	Total
C	No. of Credits

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FIRST YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16EN1201	English-II	HS	2	-	-	30	70	100	2
2	16PH1202	Semiconductor Physics	BS	4	1	-	30	70	100	4
3	16MA1201	Mathematics-II	BS	3	1	-	30	70	100	3
4	16MA1202	Mathematics-III	BS	3	-	-	30	70	100	3
5	16CS1201	Computer Programming -II	ES	3	-	-	30	70	100	3
6	16EN12L1	English – II Lab	HS	-	-	2	30	70	100	1
7	16PH12L2	Semiconductor Physics Lab	BS	-	-	3	30	70	100	2
8	16MA12L1	Computational Mathematics Lab	BS	-	-	3	30	70	100	2
9	16CS12L1	Computer Programming - II Lab	ES	-	-	3	30	70	100	2
10	16WS12L1*	Information Technology Workshop (ITWS)/ Engineering Workshop (EWS)	ES	-	-	3	30	70	100	2
Total				**15**	**2**	**14**	**300**	**700**	**1000**	**24**
Total Periods Per Week				**31**						

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SECOND YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16CS2101	Mathematical Foundations of Computer Science	PC	4	1	-	30	70	100	4
2	16CS2102	Data Structures	PC	4	-	-	30	70	100	4
3	16CS2103	Object Oriented Programming through Java	PC	3	-	-	30	70	100	3
4	16EC2103	Switching Theory and Logic Design	ES	3	1	-	30	70	100	3
5	16EE2104	Basic Electrical Engineering	ES	3	1	-	30	70	100	3
6	16CS21L1	Object Oriented Programming through Java Lab	PC	-	-	3	30	70	100	2
7	16CS21L2	Data Structures Lab	PC	-	-	3	30	70	100	2
8	16EE21L4	Basic Electrical Engineering Lab	ES	-	-	3	30	70	100	2
9	16MA2104	Logical Reasoning	BS	-	-	2	30	70	100	1
		Total		**17**	**3**	**11**	**270**	**630**	**900**	**24**
		Total Periods Per Week		**31**						

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SECOND YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16CS2201	Design and Analysis of Algorithms	PC	3	-	-	30	70	100	3
2	16CS2202	Computer Organization and Assembly Language Programming	PC	3	1	-	30	70	100	3
3	16CS2203	Database Management Systems	PC	3	-	-	30	70	100	3
4	16MA2201	Probability and Statistics	BS	4	1	-	30	70	100	4
5	16CH2201	Environmental Studies	HS	3	-	-	30	70	100	3
6	16CS22L1	Computer Organization and Assembly Language Programming Lab	PC		-	3	30	70	100	2
7	16CS22L2	Database Management Systems Lab	PC	-	-	3	30	70	100	2
8	16CS22L3	Algorithms Lab	PC	-	-	3	30	70	100	2
9	16HS22L1	Gender Sensitization	HS	-	-	3	30	70	100	2
Total				**16**	**2**	**12**	**270**	**630**	**900**	**24**
Total Periods Per Week				**30**						

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THIRD YEAR SEMESTER-I

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16CS3101	Web Technologies	PC	3	-	-	30	70	100	3
2	16CS3102	Operating Systems	PC	3	-	-	30	70	100	3
3	16CS3103	Formal Languages and Automata Theory	PC	3	1	-	30	70	100	3
4	**Soft Core-I**		SC	4	1	-	30	70	100	4
	16CS3104	Data Ware Housing and Data Mining								
	16CS3105	Computer Graphics								
5	**Open Elective – I**		OE	3	-	-	30	70	100	3
	16MB3121	Intellectual Property Rights								
	16EE3122	Industrial Safety and Hazards								
	16EC3124	Electronic Measuring Instruments								
	16ME3125	Nano Materials and Technology								
	16CE3126	Global Warming and Climate Change								
6	**Soft Core-I Lab**		SC	-	-	3	30	70	100	2
	16CS31L1	Data Ware Housing and Data Mining Lab								
	16CS31L2	Computer Graphics Lab								
7	16CS31L3	Web Technologies Lab	PC	-	-	3	30	70	100	2
8	16CS31L4	Operating Systems Lab	PC	-	-	3	30	70	100	2
9	16MB31P1	Human Values and Professional Ethics	HS	-	-	3	30	70	100	2
Total				**16**	**2**	**12**	**270**	**630**	**900**	**24**
Total Periods Per Week				**30**						

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THIRD YEAR SEMESTER-II

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16MB3201	Management Science	HS	3	-	-	30	70	100	3
2	16CS3201	Software Engineering		4	-	-	30	70	100	4
3	**Soft Core-II**		SC	4	1	-	30	70	100	4
	16CS3202	Information Security								
	16CS3203	Image Processing								
4	**Professional Elective- I**		PE	3	-	-	30	70	100	3
	16CS3204	Artificial Intelligence								
	16CS3205	Distributed Databases								
	16CS3206	Simulation and Modelling								
	16CS3207	Optimization Techniques								
5	**Open Elective –II**		OE	3	-	-	30	70	100	3
	16MB3231	Supply Chain Management								
	16EE3233	Energy Conservation and Management								
	16EC3234	Basics of Communication Systems								
	16ME3235	Manufacturing Processes								
	16CE3236	Building Technology								
6	**Open Elective –III**		OE	3	-	-	30	70	100	3
	16MB3241	Banking and Insurance								
	16EE3243	Micro-Electro-Mechanical Systems								
	16EC3244	Principles of Wireless Communication Systems								
	16ME3245	Aspects of Heat Transfer in Electronically Controlled Units								
	16CE3246	Green Buildings								
	16EN3247	Foreign Languages - French								
	16EN3248	Foreign Languages - Spanish								
	16EN3249	Foreign Languages - German								
7	**Soft Core-II Lab**		SC	-	-	3	30	70	100	2
	16CS32L1	Information Security and Software Engineering Lab								
	16CS32L2	Image Processing and Software Engineering Lab								
8	16EN32L1	Advanced English Communication Skills Lab	HS	-	-	3	30	70	100	2
Total				**20**	**1**	**6**	**240**	**560**	**800**	**24**
Total Periods Per Week				**27**						

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FOURTH YEAR SEMESTER-I#

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16CS4101	Compiler Design	PC	3	1	-	30	70	100	3
2	16CS4102	Computer Networks	PC	3	-	-	30	70	100	3
3	16CS4103	Mobile Application Development	PC	3	1	-	30	70	100	3
4	16CS4104	Cloud Computing	PC	3	-	-	30	70	100	3
5	**Professional Elective – II**		PE	3	-	-	30	70	100	3
	16CS4105	Advanced Computer Architecture								
	16CS4106	Remote Sensing and Geographical Information Systems								
	16CS4107	Distributed Systems								
	16CS4108	Soft Computing								
6	**Professional Elective-III**		PE	3	-	-	30	70	100	3
	16CS4109	Big Data Analytics								
	16CS4110	Software Practice and Testing								
	16CS4111	Parallel Algorithms								
	16CS4112	Web Services								
7	16CS41L1	Mobile Application Development and Compiler Design Lab	PC	-	-	3	30	70	100	2
8	16CS41L2	Computer Networks and Cloud Computing Lab	PC	-	-	3	30	70	100	2
9	16CS4113	Industry Oriented Mini Project	CC	-	-	-	-	100	100	1
10	16CS4114	Major Project Seminar	CC	-	-	2	100	-	100	1
Total				**18**	**2**	**8**	**340**	**660**	**1000**	**24**
Total Periods Per Week				**28**						

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FOURTH YEAR SEMESTER-II#

S.No.	Course Code	Course	Category	No. of Periods per Week			Scheme of Examination with Maximum Marks			No. of Credits
				L	T	P/D	CIE	SEE	Tot	C
1	16MB4201	Financial Analysis and Project Management	HS	4	-	-	30	70	100	4
2	**Professional Elective- IV**		PE	3	-	-	30	70	100	3
	16CS4201	Neural Networks								
	16CS4202	Machine Learning								
	16CS4203	Human Computer Interaction								
	16CS4204	Internet of Things								
3	**Open Elective – IV**		OE	3	-	-	30	70	100	3
	16MB4251	Entrepreneurship								
	16EE4253	Renewable Energy Sources								
	16EC4254	Biomedical Instrumentation								
	16ME4255	Materials Handling								
	16CE4256	Disaster Mitigation and Management								
	16MA4257	Actuarial Statistics								
4	16CS4205	Technical Seminar	CC	-	-	2	100	-	100	1
5	16CS4206	Major Project	CC	-	-	15	30	70	100	10
6	16CS4207	Comprehensive Viva Voce	CC	-	-	-	-	100	100	3
Total				**10**	**0**	**17**	**220**	**380**	**600**	**24**
Total Periods Per Week				**27**						

16CS4101 – COMPILER DESIGN

IV Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
3	1	-/-	3

Prerequisite(s): Formal Languages and Automata Theory

Course Objectives

Develop ability to

1. Understand and list the different stages in the process of compilation.
2. Identify different methods of lexical analysis
3. Design top-down and bottom-up parsers
4. Identify synthesized and inherited attributes
5. Develop syntax directed translation schemes
6. Develop algorithms to generate code for a target machine

Course Outcomes (COs)

After successful completion of this course, student would be able to

CO1. Describe different stages in the process of compilation, different methods of lexical analysis and synthesized and inherited attributes
CO2. Develop lexical analyser for a given grammar specification
CO3. Design top-down and bottom-up parsers for a given parser specification
CO4. Develop syntax directed translation schemes
CO5. Develop algorithms to generate code for a target machine

UNIT–I

Overview of Compilation: Phases of Compilation – Lexical Analysis, Regular Grammar and regular expression for common programming language features, pass and Phases of translation, interpretation, bootstrapping, data structures in compilation – LEX lexical analyzer generator.

Top down Parsing: Context free grammars, Top down parsing – Backtracking, LL (1), recursive descent parsing, Predictive parsing, Pre-processing steps required for predictive parsing.

UNIT-II

Bottom up parsing: Shift Reduce parsing, LR and LALR parsing, Error recovery in parsing , handling ambiguous grammar, YACC – automatic parser generator.

UNIT–III

Semantic analysis: Intermediate forms of source Programs – abstract syntax tree, polish notation and three address codes. Attributed grammars, Syntax directed translation, Conversion of popular Programming languages language Constructs into Intermediate code forms, Type checker.

Symbol Tables: Symbol table format, organization for block structures languages, hashing, tree structures representation of scope information. Block structures and non block structure storage allocation: static, Runtime stack and heap storage allocation, storage allocation for arrays, strings and records.

UNIT–IV

Code optimization: Consideration for Optimization, Scope of Optimization, local optimization, loop optimization, frequency reduction, folding, DAG representation.

Data flow analysis: Flow graph, data flow equation, global optimization, redundant sub expression elimination, Induction variable elements, Live variable analysis, Copy propagation.

UNIT–V

Object code generation: Object code forms, machine dependent code optimization, register allocation and assignment generic code generation algorithms, DAG for register allocation.

TEXT BOOKS

1. Principles of compiler design, A.V. Aho, J.D. Ullman, Pearson Education.
2. Modern Compiler Implementation in C, Andrew N. Appel, Cambridge University Press.

REFERENCE BOOKS

1. Lex & yacc – John R. Levine, Tony Mason, Doug Brown, O'reilly
2. Modern Compiler Design – Dick Grune, Henry E. Bal, Cariel T.H. Jacobs, Wiley dreamtech.
3. Engineering a Compiler, Cooper & Linda, Elsevier.
4. Compiler Construction, Louden, Thomson.

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16CS4102 – COMPUTER NETWORKS

IV Year. B.Tech. (CSE) – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: Operating Systems

Course Objectives

Develop ability to

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
3. To provide an opportunity to do network programming
4. To provide a WLAN measurement ideas.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Explain the functions of the different layers of the OSI Protocol.

CO2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) and describe the functions of each block.

CO3. Design a wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) for a given requirement (small scale) based on the market available components

CO4. Develop a program for a given problem related to TCP/IP protocol using network programming.

CO5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

UNIT- I

Data communication Components: Representation of data and its flow Networks , Various Connection Topology, Protocols and Standards, OSI model, Transmission Media, LAN: Wired LAN, Wireless LANs, Connecting LAN and Virtual LAN, Techniques for Bandwidth utilization: Multiplexing - Frequency division, Time division and Wave division, Concepts on spread spectrum.

UNIT- II

Data Link Layer and Medium Access Sub Layer: Error Detection and Error Correction - Fundamentals, Block coding, Hamming Distance, CRC; Flow Control and Error control protocols - Stop and Wait, Go back – N ARQ, Selective Repeat ARQ, Sliding Window, Piggybacking, Random Access, Multiple access protocols -Pure ALOHA, Slotted ALOHA, CSMA/CD,CDMA/CA

UNIT- III

Network Layer: Switching, Logical addressing – IPV4, IPV6; Address mapping – ARP, RARP, BOOTP and DHCP–Delivery, Forwarding and Unicast Routing protocols.

UNIT- IV

Transport Layer: Process to Process Communication, User Datagram Protocol (UDP), Transmission Control Protocol (TCP), SCTP Congestion Control; Quality of Service, QoS improving techniques: Leaky Bucket and Token Bucket algorithm.

UNIT- V

Application Layer: Domain Name Space (DNS), DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls, Basic concepts of Cryptography

TEXT BOOKS

1. Data Communication and Networking, 4th Edition, Behrouz A. Forouzan, McGraw-Hill,2014
2. Data and Computer Communication, 8th Edition, William Stallings, Pearson Prentice Hall India.

REFERENCE BOOKS

1. Computer Networks, 8th Edition, Andrew S. Tanenbaum, Pearson New International Edition.
2. Internetworking with TCP/IP, Volume 1, 6th Edition Douglas Comer, Prentice Hall of India.
3. TCP/IP Illustrated, Volume 1, W. Richard Stevens, Addison Wesley, United States of America.

16CS4103 – MOBILE APPLICATION DEVELOPMENT

IV Year. B.Tech. CSE – I SEM

L	T	P/D	C
3	1	-/-	3

Prerequisite(s):
OBJECT ORIENTED PROGRAMMING THROUGH JAVA

Course Objectives
Develop ability to

1. Understand the architecture of mobile software applications and mobile development frameworks and tools.
2. Use XML and UML for mobile computing
3. Understand various technologies related to generic user interface development, mobile GUIs, VUIs and their applications
4. Explain the process of modelling multichannel and multimodal user interfaces using UML
5. Understand mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

Course Outcomes (COs)
After completion of the course, student would be able to

CO1. Describe the architecture of mobile software applications and mobile development frameworks and tools.
CO2. Use XML and UML for mobile computing
CO3. Identify various technologies related to generic user interface development, mobile GUIs, VUIs and their applications
CO4. State the process of modelling multichannel and multimodal user interfaces using UML
CO5. Identify and overcome mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

UNIT-I
Introduction: Mobile computing-Introduction, added dimension of mobile computing, condition of the mobile user, architecture of mobile software applications.

Mobile Development Frameworks and Tools: Introduction, fully centralized frameworks and tools, N-tier client-server frameworks and tools, Java, BREW, Windows CE, WAP, Symbian EPOC, publishing frameworks, other tools.

UNIT-II:
XML: Introduction, XML web services, key XML technologies for mobile computing, XML and UML, putting XML to work.

UML: Introduction, user view, structural view, behavioural view, implementation view: component diagrams,

UNIT-III

Generic User Interface Development: Introduction, user interface development, building generic user interfaces, using UML for modelling generic user interface components, XForms, putting it all to work.

Developing Mobile GUIs: Introduction, WAP, J2ME, BREW and Microsoft platforms for mobile GUIs.

UNIT-IV

VUIs and Mobile Applications: Introduction, qualities of speech, voice transcription, voice recognition, text-to-speech technologies: converting written language to spoken language.

Multichannel and Multimodal User Interfaces: Introduction, modelling multichannel and multimodal applications with UML, multimodal content, software and system architectures for delivering multimodality, internationalization and localization, the evolving definition of multimodality.

UNIT-V

The Mobile Development Process: Introduction, back to the dimensions of mobility, applying the wisdom methodology to mobile development, UML-based development cycle for mobile applications.

Architecture, Design and Technology Selection for Mobile Applications: Introduction, practical concerns with architectures, architectural patterns for mobile applications.

Mobile Application Development Hurdles: Introduction, voice user interface hurdles, hurdles with multimodal applications, problems with building location based applications, power use.

TEXT BOOK

1. Mobile Computing Principles: Designing and Developing Mobile Applications with UML and XML, Reza B'Far, Cambridge University Press, 2005.

REFERENCE BOOKS

1. Beginning Android Application Development, Wei Meng Lee, Wiley Publishing Inc, 2011.
2. Professional Mobile Application Development, Jeff McWherter, Scott Gowell, John Wiley & Sons, Inc, 2012.

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16CS4104 – CLOUD COMPUTING

IV Year. B.Tech. CSE – I SEM

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): Operating Systems

Course Objectives

Develop ability to

1. Understand different computing models.
2. Introduce various types of virtualizations and hypervisors
3. Use and adopt Cloud Computing services and tools in their real life scenarios.
4. Explore some important cloud computing driven commercial systems such as Amazon Web Services, Google cloud services, Microsoft Azure etc.
5. Describe the security aspects in cloud

Course Outcomes (COs)

Upon successful completion of this course, students will be able to

CO1. Distinguish different types of Distributed Computing models and Identify different cloud computing models and services provided by cloud providers
CO2. Illustrate Cloud Applications and Paradigms
CO3. Demonstrate virtualization of clusters and data centers
CO4. Apply and design Cloud Resource Management and scheduling algorithms
CO5. Explain Storage models and security aspects of Cloud

Unit-I

Introduction: Network-Centric Computing and Network-Centric Content, Peer-to-Peer Systems, Distributed computing, Cloud Computing, Cloud Computing Delivery Models and Services, Ethical Issues in Cloud Computing, Cloud Vulnerabilities, Major Challenges of Cloud Computing

Cloud Infrastructure: Cloud Computing at Amazon, Cloud Computing: The Google Perspective, Microsoft Windows Azure and Online Services, Open-Source Software Platforms for Private Clouds, Cloud Computing Interoperability: The Intercloud, Energy Use and Ecological Impact of Large-Scale Data Centers, Service- and Compliance-Level Agreements.

Unit-II

Cloud Computing: Applications and Paradigms, Challenges for Cloud Computing, Existing Cloud Applications and New Application Opportunities, Architectural Styles for Cloud Applications, Workflows: Coordination of Multiple Activities, Coordination Based on a State Machine Model: The ZooKeeper , The MapReduce Programming Model.

Cloud Resource Virtualization: Virtualization, Layering and Virtualization, Virtual Machine Monitors , Virtual Machines , Performance and Security Isolation , Full Virtualization and Para virtualization , Hardware Support for Virtualization , Case Study: Xen, a VMM Based on Para virtualization , Optimization of Network Virtualization in Xen , vBlades: Para virtualization Targeting an Itanium Processor , A Performance Comparison of Virtual Machines , The Darker Side of Virtualization , Software Fault Isolation

Unit-III

Cloud Resource Management: Policies and Mechanisms for Resource Management , Applications of Control Theory to Task Scheduling on a Cloud , Stability of a Two-Level Resource Allocation Architecture , Feedback Control Based on Dynamic Thresholds , Coordination of Specialized Autonomic Performance Managers, A Utility-Based Model for Cloud-Based Web Services, Resource Bundling: Combinatorial Auctions for Cloud Resources

Unit-IV

Storage Systems: The Evolution of Storage Technology, Storage Models, File Systems, and Databases, Distributed File Systems: General Parallel File System, Google File System, Apache Hadoop, Locks and Chubby: A Locking Service, Transaction Processing and NoSQL Databases, BigTable, Megastore Cloud

Application Development Amazon Web Services: EC2 Instances, Connecting Clients to Cloud Instances Through Firewalls, Security Rules for Application and Transport Layer Protocols in EC2, How to Launch an EC2 Linux Instance and Connect to it, How to Use S3 in Java, How to Install the Simple Notification Service on Ubuntu.

Unit-V

Cloud Security: Cloud Security Risks, Security: The Top Concern for Cloud Users, Privacy and Privacy Impact Assessment, Trust, Operating System Security, Virtual Machine Security, Security of Virtualization, Security Risks Posed by Shared Images, Security Risks Posed by a Management OS, Xoar: Breaking the Monolithic Design of the TCB, A Trusted Virtual Machine Monitor.

TEXT BOOK

1. Cloud Computing Theory and Practice, Dan C. Marinescu, Elsevier, 2nd edition, 2018.

REFERENCE BOOKS

1. Cloud Computing ,A practical approach, Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, Indian Edition
2. Cloud Computing: Principles and Paradigms by Rajkumar Buyya, James Broberg and Andrzej M. Goscinski, Wiley, 2011.
2. Distributed and Cloud Computing: From parallel processing to the Internet of Things, Kai Hwang, Geoffrey C. Fox, Jack J.Dongarra
3. Cloud Security and Privacy: An Enterprise Perspective on Risks and Compliance, Tim Mather, Subra Kumaraswamy, Shahed Latif, O'Reilly, SPD, rp2011.

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16CS4105 – ADVANCED COMPUTER ARCHITECTURE (PROFESSIONAL ELECTIVE-II)

IV Year. B.Tech. CSE – I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):

COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING

Course Objectives

Develop the ability to

1. Understand scalable performance of various parallel computer models in terms of program and network properties and performance metrics and measures.
2. Understand the importance of hardware technologies involved in parallelism, such as, processors, bus, cache memory, shared memory along with techniques, such as, pipelining and superscalar techniques.
3. Understand various parallel and scalable architectures, like, multiprocessors, multicomputers, multivector and SIMD computers etc..
4. Understand various softwares for parallel programming, like, languages, compilers and parallel program development and environments.
5. Understand instruction level and system level parallelisms and describe trends in parallel systems

Course Outcomes (COs)

At the end of the course, the student should be able to:

CO1. Describe the scalable performance of various parallel computer models in terms of program and network properties and performance metrics and measures.
CO2. Highlight the importance of hardware technologies involved in parallelism, such as, processors, bus, cache memory, shared memory along with techniques, such as, pipelining and superscalar techniques.
CO3. Differentiate various parallel and scalable architectures, like, multiprocessors, multicomputers, multivector and SIMD computers etc..
CO4. Identify various softwares for parallel programming, like, languages, compilers and parallel program development and environments.
CO5. Differentiate instruction level and system level parallelisms and describe trends in parallel systems

UNIT-I: Theory of Parallelism

Parallel Computer Models: The State of Computing, Multiprocessors and Multicomputers, Multivector and SIMD Computers, PRAM and VLSI Models, Architectural Development Tracks.

Program and Network Properties: Conditions of Parallelism, Program Partitioning and Scheduling, Program Flow Mechanisms, System Interconnect Architectures.

Principles of Scalable Performance: Performance Metrics and Measures, Parallel Processing Applications, Speedup Performance Laws, Scalability Analysis and Approaches.

UNIT-II: Hardware Technologies

Processors and Memory Hierarchy: Advanced Processor Technology, Superscalar and Vector Processors, Memory Hierarchy Technology, Virtual Memory Technology.

Bus, Cache, and Shared Memory: Bus Systems, Cache Memory Organizations, Shared Memory Organizations, Sequential and Weak Consistency Models.

Pipelining and Superscalar Techniques: Linear Pipeline Processors, Nonlinear Pipeline Processors, Instruction Pipeline Design, Arithmetic Pipeline Design, Superscalar Pipeline Design.

UNIT-III: Parallel and Scalable Architectures

Multiprocessors and Multicomputers: Multiprocessor System Interconnects, Cache Coherence and Synchronization Mechanisms, Three Generations of Multicomputers, Message-Passing Mechanisms.

Multivector and SIMD Computers: Vector Processing Principles, Multivector Multiprocessors, Compound Vector Processing, SIMD Computer Organizations, Connection Machine CM-5.

Scalable, Multithreaded, and Dataflow Architectures: Latency-Hiding Techniques, Principles of Multithreading, Fine-Grain Multicomputers, Scalable and Multithreaded Architectures, Dataflow and Hybrid Architectures.

UNIT-IV: Software for Parallel Programming

Parallel Models, Languages, and Compilers: Parallel Programming Models, Parallel Languages and Compilers, Dependence Analysis of Data Arrays, Code Optimization and Scheduling, Loop Parallelization and Pipelining.

Parallel Program Development and Environments: Parallel Programming Environments, Synchronization and Multiprocessing Modes, Shared Variable Program Structures, Message-Passing Program Development, Mapping Programs onto Multicomputers.

UNIT-V:Instruction and System Level Parallelism

Instruction Level Parallelism: Computer Architecture, Basic Design Issues, Problem Definition, Model of a Typical Processor, Compiler-detected Instruction Level Parallelism, Operand Forwarding, Reorder Buffer, Register Renaming, Tomasulo's Algorithm, Branch Prediction, Limitations in Exploiting Instruction Level Parallelism, Thread Level Parallelism.

Trends in Parallel Systems: Brief Overview of Technology, Forms of Parallelism, Case Studies, Parallel Programming Models and Languages.

TEXT BOOK

1. Avanced Computer Architecture: Parallelism, Scalability, Programmability, Kai Hwang, Naresh Jotwani, 3rd edition, McGraw Hill Education, 2016.

REFERENCE BOOKS

1. Computer organization and design, David A. Patterson and John L. Hennessey, Morgan Kauffman / Elsevier, 5th edition, 2014.
2. Computer Organisation, V. Carl Hamacher, Zvonko G. Varanesic and Safat G. Zaky, 6th edition, Mc Graw-Hill Inc, 2012.
3. Computer Organization and Architecture, William Stallings, 7th Edition, Pearson Education, 2006.
4. Computer Architecture and Organization, John P. Hayes, Third Edition, Tata Mc Graw Hill, 1998.

16CS4106-REMOTE SENSING AND GEOGRAPHICAL INFORMATION SYSTEMS (PROFESSIONAL ELECTIVE-II)

IV Year.B.Tech. CSE –I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand basic principles of remote sensing
2. Understand various remote sensing platforms and sensors in general and visual image interpretation in particular.
3. Understand fundamentals of GIS like, roots, definitions, terminology, architecture and theoretical framework.
4. Understand various issues related to data quality, data analysis and data modelling
5. Understand the integration of remote sensing and GIS

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Describe the basic principles of remote sensing
CO2. Explain about various remote sensing platforms and sensors in general and visual image interpretation in particular.
CO3. Describe fundamentals of GIS like, roots, definitions, terminology, architecture and theoretical framework.
CO4. Articulate various issues related to data quality, data analysis and data modelling
CO5. Perform integration of remote sensing and GIS

UNIT-I

Remote Sensing-Basic Principles: Introduction, Electromagnetic Remote Sensing Process, Physics of Radiant Energy, Energy Source and its Characteristics, Atmospheric Interactions with Electromagnetic Radiation, Energy Interactions with Earth's Surface Materials, Cossine Law.

UNIT-II

Remote sensing platforms and sensors: Introduction, Satellite system parameters, Sensor parameters, imaging sensor systems, earth resources satellites, meteorological satellites, satellites carrying microwave sensors, OCEANSAT-1(IRS-P4), IKONOS Satellite series, Latest trends in remote sensing platforms and sensors.

Visual Image Interpretation: Introduction, Types of Pictorial Data Products, Image interpretation strategy, Process of Image Interpretation, Interpretation of Aerial Photo, General Procedure for photo interpretation, Three dimensional interpretation method, Basic elements of image interpretation, Interpretation of satellite imagery, key elements of visual image interpretation, Concept of converging evidence.

UNIT-III

Fundamentals of GIS: Introduction, Roots of GIS, Overview of information system, The four Ms, Contribution disciplines, GIS definitions and terminology, GIS Queries, GIS architecture,

Theoretical Models of GIS, Theoretical framework of GIS, GIS categories, Levels/ Scales of measurement.

Spatial data modelling: Introduction, Stages of GIS data modelling, graphic representation of spatial data, raster GIS models, vector GIS models, Comparison of raster and vector models.

UNIT-IV

Data quality issues: Introduction, components of data quality, accuracy, precision and resolution, consistency, completeness, sources of error in GIS, modelling errors, error evaluation by graphical methods.

Data analysis and modelling: introduction, format conversion, data medium conversion, spatial measurement methods, reclassification, buffering techniques, overlay analysis, modelling surfaces, modelling networks, GIS output.

UNIT-V

Integration of remote sensing and GIS: Introduction, remote sensing and GIS synergy, raster data for GIS, vector data for GIS, need for integration, facilities for integration, general view on applications, software scenario.

TEXT BOOKS

1. Remote Sensing and Image Interpretation Lillesand and Kiefer John Wiley and Sons, 2017
2. Textbook of Remote Sensing and Geographical Information Systems, 3rd edition, M. Anji Reddy, BS Publications.

REFERENCE BOOKS

1. Remote Sensing and Geographical Information systems M.Anji Reddy B.S.Publications
2. Remote Sensing and Geographical Information System A.M. Chandra, S.K. Ghosh Narosa Publishing house
3. Fundamental of GIS Micheal N Demers JohnWiley & Sons

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16CS4107 – DISTRIBUTED SYSTEMS
(PROFESSIONAL ELECTIVE-II)

IV Year. B.Tech. CSE – I SEM

L	T	P/D	C
3	-	-/-	3

Prerequisite(s):Operating Systems

Course Objectives

Develop ability to

1. Understand what and why a distributed system is
2. Understand Theoretical concepts namely virtual time, agreement and consensus protocols.
3. Understand IPC, group communication and RPC concepts
4. Understand the DFS and DSM concepts
5. Understand the concepts of transaction in distributed environment and associated concepts namely, concurrency control, deadlocks and error recovery.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Describe the advantages and disadvantages of distributed system models using the characteristics of the distributed system and the desired features.
CO2. Highlight the importance of time & global states and coordination & agreement.
CO3. Describe various aspects of inter process communication, distributed objects and remote invocation in distributed systems.
CO4. Study distributed file systems (Sun Network File System, The Andrew File System), Name services (The global name services), distributed shared memory (Sequential consistency and IVY, Munin) and distributed multimedia (Amoeba, Mach, Chorus).
CO5. Explain transactions and concurrency control in distributed systems.

UNIT-I

Characterization of Distributed Systems: Introduction, Examples of Distributed Systems, Goals of Distributed system, Hardware and Software concepts, Advantages & Disadvantage distributed system, Issues in designing Distributed System, Resource Sharing and the Web, Challenges.

System Models: Introduction, Architectural Models, Fundamental Models.

UNIT-II

Time and Global States: Introduction, Clocks Events and Process States, Synchronizing Physical Clocks, Logical Time and Logical Clocks, Global States, Distributed Debugging.

Coordination and Agreement: Introduction, Distributed Mutual Exclusion, Elections, Multicast Communication, Consensus and Related Problems.

UNIT-III

Inter Process Communication: Introduction, The API for the Internet Protocols, External Data Representation and Marshalling, Client-Server Communication, Group Communication, Case Study: IPC in UNIX**.**

Distributed Objects and Remote Invocation: Introduction, Communication between Distributed Objects, Remote Procedure Call, Events and Notifications, Case Study: JAVA RMI.

UNIT-IV

Distributed File Systems: Introduction, File Service Architecture, Case Study 1: Sun Network File System, Case Study 2: The Andrew File System.

Name Services: Introduction, Name Services and the Domain Name System, Directory Services, Case Study of the Global Name Services.

Distributed Shared Memory: Introduction, Design and Implementation Issues, Sequential Consistency and IVY case study, Release Consistency, Munin Case Study, Other Consistency Models.

Distributed Multimedia: Characteristics of multimedia Data, Quality of Service Managements, Case Study of Distributed System: Amoeba, Mach, Chorus.

UNIT- V

Transactions and Concurrency Control: Introduction, Transactions, Nested Transactions, Locks, Optimistic Concurrency Control, Timestamp Ordering, Comparison of Methods for Concurrency Control.

Distributed Transactions: Introduction, Flat and Nested Distributed Transactions, Atomic Commit Protocols, Concurrency Control in Distributed Transactions, Distributed Deadlocks, Transaction Recovery.

TEXT BOOK

1. Distributed Systems, Concepts and Design, George Coulouris, J Dollimore and Tim Kindberg, Pearson Education, 2013.

REFERENCE BOOKS

1. Distributed Systems, Principles and Paradigms, Andrew S. Tanenbaum, Maarten Van Steen, 2nd Edition, PHI.
2. Distributed Systems, An Algorithm Approach, Sukumar Ghosh, Chapman & Hall/CRC, Taylor & Fransis Group, 2007.

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16CS4108-SOFT COMPUTING
(PROFESSIONAL ELECTIVE-II)

IV Year. B.Tech. CSE –I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Explain AI problems and search techniques
2. Understand the supervised and unsupervised learning networks
3. Elaborate classical sets and fuzzy sets
4. Understand fuzzy decision making
5. Understand and design genetic algorithms.

Course Outcomes (COs)

Upon successful completion of this course, students will be able to

CO1. Apply search techniques to solve AI problems.
CO2. Describe various supervised learning networks
CO3. Comprehend the differences between classical sets and fuzzy sets.
CO4. Perform fuzzy decision making
CO5. Describe solutions using genetic algorithms for real time problems.

UNIT-I

AI Problems and Search: AI problems, Techniques, Problem Spaces and Search, Heuristic Search Techniques- Generate and Test, Hill Climbing, Best First Search Problem reduction, Constraint Satisfaction and Means End Analysis. Approaches to Knowledge Representation-Using Predicate Logic and Rules.

UNIT-II

Supervised Learning Networks-perceptron, Back propagation algorithm-Classification Problem-Speech Processing Case study. Unsupervised Learning Network- Introduction, Fixed Weight Competitive Nets, Maxnet, Hamming Network, Kohonen Self-Organizing Feature Maps, Learning Vector Quantization,

UNIT-III

Introduction to Classical Sets (crisp Sets) and Fuzzy Sets- operations and Fuzzy sets. Classical Relations -and Fuzzy Relations-Cardinality, Operations, Properties and composition. Tolerance and equivalence relations. Membership functions- Features, Fuzzification, membership value assignments, Defuzzification.

UNIT-IV

Fuzzy Arithmetic and Fuzzy Measures, Fuzzy Rule Base and Approximate Reasoning Fuzzy Decision making Fuzzy Logic Control Systems. Genetic Algorithm- Introduction and basic operators and terminology. Applications: Optimization of TSP, Internet Search Technique

UNIT-V

Genetic Algorithms-Introduction, Biological background, Search space, Basic technologies, Simple and general genetic algorithms, Operations in genetic algorithms, Stopping criteria and constraints in genetic algorithms, Problem solving using genetic algorithms.

TEXT BOOK

1. Principles of Soft Computing- S N Sivanandam, S N Deepa, Wiley India, 2015

REFERENCE BOOKS

1. Soft Computing and Intelligent System Design -Fakhreddine O Karray, Clarence D Silva,. Pearson Edition, 2004.
2. Artificial Intelligence and SoftComputing-Behavioural and Cognitive Modelling of the Human Brain- Amit Konar, CRC press, Taylor and Francis Group.
3. Artificial Intelligence – Elaine Rich and Kevin Knight, TMH, 1991, rp2008.
4. Artificial Intelligence – Patric Henry Winston – Third Edition, Pearson Education.
5. A first course in Fuzzy Logic-Hung T Nguyen and Elbert A Walker, CRC. Press Taylor and Francis Group

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16CS4109 – BIG DATA ANALYTICS
(PROFESSIONAL ELECTIVE - III)

IV Year B. Tech. CSE-I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand the features of R and the process of importing and exporting data from various databases in R
2. Understand the features and modes of Hadoop along with HDFS and MapReduce architectures.
3. Explain RHIPE, RHadoop and Hadoop Streaming with R.
4. Understand all the steps of data analytics project life cycle and application to various data analytics projects.
5. Perform various supervised and unsupervised machine learning algorithms for big data analysis.

Course Outcomes (COs)

After successful completion of the course, student would be able to

CO1. Describe the features of R and the process of importing and exporting data from various databases in R
CO2. Identify the features and modes of Hadoop along with HDFS and MapReduce architectures.
CO3. Describe and use RHIPE, RHadoop and Hadoop Streaming with R.
CO4. Identify and perform all the steps of data analytics project life cycle on various data analytics projects.
CO5. Perform various supervised and unsupervised machine learning algorithms for big data analysis.

UNIT-I: Getting Ready to use R and Hadoop: Features of R language, importing and exporting data from various databases, different Hadoop modes, Hadoop features, HDFS, HDFS and MapReduce architecture.
Hadoop MapReduce, fundamentals, writing a Hadoop MapReduce example, Hadoop MapReduce in R.

UNIT-II: Integrating R and Hadoop: RHIPE-architecture, samples, function reference, **RHadoop**-architecture, samples, function reference, **Hadoop streaming with R**-basics, run Hadoop streaming with R, Exploring HadoopStreaming R package

UNNIT-III: Data Analytics with R and Hadoop: Data analytics project life cycle-identifying the problem, designing data requirement, preprocessing data, performing analytics over data, visualizing data.

UNIT-IV: Data Analytics Problems-exploring web page categorization, computing the frequency of stock market change, predicting the sale price of blue book for bulldozers (case study)

UNIT-V: Big Data Analysis with Machine Learning: Introduction to machine learning, supervised machine learning algorithms-linear regression, logistic regression, unsupervised machine learning algorithm-clustering, recommendation algorithms.

TEXT BOOK

1. Big Data Analytics with R and Hadoop, Vignesh Prajapati, PACKT Publishing, 2013.

REFERENCE BOOKS

1. Big Data and Analytics, Seema Acharya, Subhasinin Chellappan, Wiley publications, 2016.
2. Big Data, Black BookTM , DreamTech Press, 2015 Edition.
3. Business Analytics 5e , BY Albright Winston
4. Business Intelligence –Practice, Technologies and Management, Rajiv Sabherwal, Irma Becerra- Fernandez, John Wiley 2011.
5. Business Intelligence Roadmap, Lariss T. Moss, ShakuAtre, Addison-Wesley It Service.
6. Oracle Business Intelligence : The Condensed Guide to Analysis and Reporting, Yuli Vasiliev, SPD Shroff, 2012.

16CS4110 – SOFTWARE PRACTICE AND TESTING
(PROFESSIONAL ELECTIVE - III)

IV Year B. Tech. CSE-I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand the behavior of the testing techniques to detect the errors in the software
2. Understand standard principles and to check the occurrence of defects and its removal.
3. Understand the functionality of automated testing tools
4. Understand the various models of software reliability.
5. Understand the estimation of cost and schedule based on standard metrics.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Test the software by applying testing techniques to deliver a product free from bugs and evaluate the web applications using bug tracking tools
CO2. Investigate the scenario and the able to select the proper testing technique
CO3. Explore the test automation concepts and tools
CO4. Deliver quality product to the clients by way of applying standards such as TQM, Six Sigma.
CO5. Evaluate the estimation of cost, schedule based on standard metrics.

UNIT I TESTIING ENVIRONMENT AND TEST PROCESSES

World-Class Software Testing Model – Building a Software Testing Environment - Overview of Software Testing Process – Organizing for Testing – Developing the Test Plan – Verification Testing – Analyzing and Reporting Test Results – Acceptance Testing – Operational Testing – Post Implementation Analysis

UNIT II TESTING TECHNIQUES AND LEVELS OFTESTING

Using White Box Approach to Test design - Static Testing Vs. Structural Testing – Code Functional Testing – Coverage and Control Flow Graphs –Using Black Box Approaches to Test Case Design – Random Testing – Requirements based testing –Decision tables –State-based testing – Cause-effect graphing – Error guessing – Compatibility testing – Levels of Testing - Unit Testing - Integration Testing - Defect Bash Elimination. System Testing - Usability and Accessibility Testing – Configuration Testing - Compatibility Testing - Case study for White box testing and Black box testing techniques.

UNIT III INCORPORATING SPECIALIZED TESTING RESPONSIBILITIES

Testing Client/Server Systems – Rapid Application Development Testing – Testing in a Multiplatform Environment – Testing Software System Security - Testing Object-Oriented Software – Object Oriented Testing – Testing Web based systems – Web based system – Web Technology Evolution – Traditional Software and Web based Software – Challenges in Testing for Web-based Software –Testing a Data Warehouse - Case Study for Web Application Testing.

UNIT IV TEST AUTOMATION

Selecting and Installing Software Testing Tools - Software Test Automation – Skills needed for Automation – Scope of Automation – Design and Architecture for Automation – Requirements for a Test Tool – Challenges in Automation – Tracking the Bug – Debugging – Case study using Bug Tracking Tool.

UNIT V SOFTWARE TESTING AND QUALITY METRICS

Testing Software System Security - Six-Sigma – TQM - Complexity Metrics and Models – Quality Management Metrics - Availability Metrics - Defect Removal Effectiveness - FMEA - Quality Function Deployment – Taguchi Quality Loss Function – Cost of Quality. Case Study for Complexity and Object Oriented Metrics.

TEXT BOOK(S)

1. Effective Methods of Software Testing, William Perry, 3rd Edition, Wiley Publishing 2012.

REFERENCE BOOK(S)

1. Practical Software Testing, LleneBurnstein, Springer International Edition, Chennai, 2003
2. Software Testing – Principles and Practices, Srinivasan Desikan and Gopalaswamy Ramesh, Pearson Education, 2007.
3. Software Testing Principles and Practices, Naresh Chauhan, Oxford University Press, New Delhi, 2010.
4. Total Quality Management, Dale H. Besterfiled et al., Pearson Education Asia, Third Edition, Indian Reprint (2006).
5. Metrics and Models in Software Quality, Stephen Kan, Addison – Wesley, Second Edition, 2004.
6. Software Testing – Effective Methods, Tools and Techniques, RenuRajani,Pradeep Oak, Tata McGraw Hill,2004.
7. Software Testing in the Real World – Improving the Process, Edward Kit, Pearson Education, 1995.

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16CS4111 – PARALLEL ALGORITHMS
(PROFESSIONAL ELECTIVE - III)

IV Year B. Tech. CSE-I Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None

Course Objectives

Develop ability to

1. Understand various aspects of PRAM model
2. Understand sorting networks
3. Understand networking: topologies, interconnection
4. Understand various algorithms on a ring of processors.
5. Understand various algorithms on grids of processors.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Describe various aspects of PRAM model
CO2. Explain sorting networks
CO3. Discuss networking: topologies, interconnection
CO4. Comprehend various algorithms on a ring of processors.
CO5. Comprehend various algorithms on grids of processors.

UNIT-I

Models, PRAM Model, Pointer Jumping, List, Ranking Prefix Computation, Euler Tour, Performance Evaluation of PRAM Algorithms Cost, Work, Speedup and Efficiency, A Simple Simulation Result, Brent's Theorem, Comparison of PRAM Models, Model Separation, Simulation Theorem, Sorting Machine, Merge, Sorting Trees, Complexity and Correctness, Relevance of the PRAM Model.

UNIT-II

Sorting Networks, Odd-Even Merge Sort, Odd-Even Merging Network, Sorting Network,0–1 Principle, Sorting on a One-Dimensional Network, Odd-even Transposition Sort, Odd-even Sorting on a One-Dimensional Network.

UNIT-III

Networking, Interconnection Networks, Topologies, A Few Static Topologies, Dynamic Topologies, communication Model, A Simple Performance Model, Point-to-Point Communication Protocols, More Precise Models, CASE Study: the Unidirectional Ring, Broadcast, Scatter, all-to-all, Pipelined Broadcast, Case Study: the Hypercube, Labeling Vertices, Paths and Routing in a Hypercube, Embedding Rings and Grids into Hypercubes, Collective Communications in a Hypercube, Peer-to-Peer Computing, distributed Hash Tables and Structured Overlay Networks.

UNIT-IV

Algorithms on a Ring of Processors, marix-Vector Multiplication, Matrix-Matrix Multiplication, First Look at Stencil Applications, A Simple Sequential Stencil Algorithm,

Parallelizations of the Stencil Algorithm, LU Factorization, Pipelining on the Ring, Look-Ahead Algorithm, Parallelization on a Unidirectional Ring, Parallelization on a Bidirectional Ring, implementing Logical Topologies, distributed vs. Centralized Implementations.

UNIT-V

Algorithms on Grids of Processors, Logical 2-D Grid Topologies, Communication on a Grid of Processors, Matrix Multiplication on a Grid of Processors, The Outer-Product Algorithm, Grid vs. Ring, Three Matrix Multiplication Algorithms, Performance Analysis of the Three Algorithms,2-D block cyclic data distribution.

TEXT BOOK(S)

1. Parallel Algorithms, Henri Casanova, Arnaud Legrand, Chapman & Hall/CRC Numerical Analysis and Scientific Computing Series, 2008

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16CS4112 – WEB SERVICES
(PROFESSIONAL ELECTIVE - III)

IV Year B. Tech. CSE-I Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand evolution, emergence, introduction and architecture of web services.
2. Understand core fundamentals of SOAP and development of web services using SOAP
3. Understand WSDL
4. Understand web service discovery
5. Understand the interoperability of web services

Course Outcomes

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

CO1. Describe evolution, emergence, introduction and architecture of web services.
CO2. Describe core fundamentals of SOAP and develop web services using SOAP
CO3. Use WSDL
CO4. Explain web service discovery
CO5. Articulate the interoperability of web services

UNIT - I

Evolution and Emergence of Web Services - Evolution of distributed computing. Core distributed computing technologies -client/server, CORBA, JAVARMI, MicroSoft DCOM, MOM, Challenges in Distributed Computing. Role of J2EE and XML in distributed computing, emergence of Web Services and Service Oriented Architecture (SOA).

Introduction to Web Services - The definition of web services, basic operational model of web services, tools and technologies enabling web services, benefits and challenges of using web services.

Web Services Architecture - Web services Architecture and its characteristics, core building blocks of web services, standards and technologies available for implementing web services, web services communication, basic steps of implementing web services, developing web services enabled applications

UNIT-II

Core fundamentals of SOAP - SOAP Message Structure, SOAP encoding, SOAP message exchange models, SOAP communication and messaging, SOAP security.

Developing Web Services using SOAP - Building SOAP Web Services, developing SOAP Web Services using Java, limitations of SOAP.

UNIT- III

Describing Web Services - WSDL - WSDL in the world of Web Services, Web Services life cycle, anatomy of WSDL definition document, WSDL bindings, WSDL Tools, limitations of WSDL.

UNIT- IV

Discovering Web Services - Service discovery, role of service discovery in a SOA, service discovery mechanisms, UDDI - UDDI Registries, uses of UDDI Registry, Programming with UDDI. UDDI data structures, support for categorization in UDDI Registries, Publishing API, Publishing information to a UDDI Registry, searching information in a UDDI Registry, deleting information in a UDDI Registry, limitations of UDDI.

UNIT- V

Web Services Interoperability - Means of ensuring Interoperability, Overview of .NET and J2EE. Web Services Security - XML security frame work, XML encryption, XML digital signature, XKMS structure, guidelines for signing XML documents.

TEXT BOOK(S)

1. Developing Java Web Services, R. Nagappan, R. Skoczylas, R.P. Sriganesh, Wiley India, rp-2016..

REFERENCE BOOK(S)

1. Building Web Services with Java, 2nd Edition, S. Graham and others. PearsonEdn., 2008.
2. Java Web Services, D. A. Chappell & T. Jewell, O'Reilly,SPD.
3. McGovern, et al., "Java Web Services Architecture", Morgan Kaufmarrn Publishers,2005.
4. J2EE Web Services, Richard Monson-Haefel, Pearson Education.
5. Web Services, G. Alonso, F. Casati and others, Springer, 2005.

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16CS41L1 – MOBILE APPLICATION DEVELOPMENT AND COMPILER DESIGN LAB

IV Year. B.Tech. CSE – I SEM

L	T	P/D	C
-	-	3/-	2

Mobile Application Development Lab

Course Objectives

Develop ability to

1. Understand the architecture of mobile software applications and mobile development frameworks and tools.
2. Use XML and UML for mobile computing
3. Understand various technologies related to generic user interface development, mobile GUIs, VUIs and their applications
4. Explain the process of modelling multichannel and multimodal user interfaces using UML
5. Understand mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Describe the architecture of mobile software applications and mobile development frameworks and tools.
CO2. Use XML and UML for mobile computing
CO3. Identify various technologies related to generic user interface development, mobile GUIs, VUIs and their applications
CO4. State the process of modelling multichannel and multimodal user interfaces using UML
CO5. Identify and overcome mobile application development hurdles with proper selection of architecture, design and technology in mobile application development process.

List of exercises

1. Create an android application to display a message on the screen.
2. Create android applications using following layouts
    a. Linear layout
    b. Absolute layout
    c. Table layout
    d. Relative layout
    e. Frame layout
3. Create android applications using following views
    a. Basic views
    b. Picker views
    c. List views
    d. Image views
4. Send an SMS message in android programmatically
5. Display a locations marker on a map in android programmatically
6. Design a mobile web application with all HTML5 form elements.

7. Write a mobile web application to demonstrate HTML5 offline storage

Compiler Design Lab

Course Objectives

Develop ability to

1. Understand and list the different stages in the process of compilation.
2. Identify different methods of lexical analysis
3. Design top-down and bottom-up parsers
4. Identify synthesized and inherited attributes
5. Develop syntax directed translation schemes
6. Develop algorithms to generate code for a target machine

Course Outcomes (COs)

After successful completion of this course, student would be able to

CO1. Describe different stages in the process of compilation, different methods of lexical analysis and synthesized and inherited attributes
CO2. Develop lexical analyser for a given grammar specification
CO3. Design top-down and bottom-up parsers for a given parser specification
CO4. Develop syntax directed translation schemes
CO5. Develop algorithms to generate code for a target machine

List of exercises

1. Design a lexical analyzer for given language and the lexical analyzer should ignore redundant spaces, tabs and new lines. It should also ignore comments. Although the syntax specification states that identifiers can be arbitrarily long, you may restrict the length to some reasonable value. Simulate the same in C language.
2. Write a C program to identify whether a given line is a comment or not.
3. Write a C program to recognize strings under 'a', 'a*b+', 'abb'.
4. Write a C program to test whether a given identifier is valid or not.
5. Write a C program to simulate lexical analyzer for validating operators.
6. Implement the lexical analyzer using JLex, flex or other lexical analyzer generating tools.
7. Write a C program for implementing the functionalities of predictive parser for the mini language specified in Note 1.
8. a) Write a C program for constructing of LL (1) parsing.
   b) Write a C program for constructing recursive descent parsing.
9. Write a C program to implement LALR parsing.
10. a) Write a C program to implement operator precedence parsing.
    b) Write a C program to implement Program semantic rules to calculate the expression that takes an expression with digits, + and * and computes the value.
11. Convert the BNF rules into Yacc form and write code to generate abstract syntax tree for the mini language specified in Note 1.
12. Write a C program to generate machine code from abstract syntax tree generated by the parser. The instruction set specified in Note 2 may be considered as the target code.

16CS41L2– COMPUTER NETWORKS AND CLOUD COMPUTING LAB

IV Year B. Tech. CSE-I Sem

L	T	P/D	C
-	-	3/-	2

Prerequisites: None

Computer Networks Lab:

Course Objectives

Develop ability to

1. To develop an understanding of modern network architectures from a design and performance perspective.
2. To introduce the student to the major concepts involved in wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs).
3. To provide an opportunity to do network programming
4. To provide a WLAN measurement ideas.

Course Outcomes

After completion of the course, student would be able to

CO1. Explain the functions of the different layers of the OSI Protocol.

CO2. Draw the functional block diagram of wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) and describe the functions of each block.

CO3. Design a wide-area networks (WANs), local area networks (LANs) and Wireless LANs (WLANs) for a given requirement (small scale) based on the market available components

CO4. Develop a program for a given problem related to TCP/IP protocol using network programming.

CO5. Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

List of exercises

1. Study of different types of Network cables and practically implement the cross-wired cable and straight through cable using clamping tool.
2. Study of Network devices, IP in details.
3. Connect the computers in LAN, Study of basic network command and network configuration commands
4. Configure a network topology using packet tracer software.
5. Configure a network using Distance Vector Routing protocol and Link State routing protocol.

Cloud Computing Lab:

Course Objectives

Develop ability to

1. Understand different computing models.
2. Introduce various types of virtualizations and hypervisors
3. Use and adopt Cloud Computing services and tools in their real life scenarios.
4. Explore some important cloud computing driven commercial systems such as Amazon Web Services, Google cloud services, Microsoft Azure etc.
5. Describe the security aspects in cloud

Course Outcomes (COs)

Upon successful completion of this course, students will be able to

CO1. Distinguish different types of Distributed Computing models and Identify different cloud computing models and services provided by cloud providers
CO2. Illustrate Cloud Applications and Paradigms
CO3. Demonstrate virtualization of clusters and data centers
CO4. Apply and design Cloud Resource Management and scheduling algorithms
CO5. Explain Storage models and security aspects of Cloud

List of exercises

1. Create Virtual machines using Open source software : VM Ware/ Oracle Virtual Box
2. Use Amazon EC2 to create a virtual machine
3. Use Amazon S3 in Java
4. Install the Simple Notification Service on Ubuntu
5. Other Amazon services available in free tier.
6. Case Study2: Microsoft Azure
7. Case Study 3: Google App Engine
8. Study and Implement IaaS using OpenStack
9. Implement Identity Management feature using OpenStack
10. Security Rules for Application and Transport Layer Protocols in EC2

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16MB4201 – FINANCIAL ANALYSIS AND PROJECT MANAGEMENT

IV Year B. Tech. CSE-II Sem

L	T	P/D	C
4	-	-/-	4

Pre requisites: None

Course Objective

Develop ability to

1. Familiarize and acquaint the student with accounting concepts and analysis.
2. Evaluate alternative techniques for analyzing project opportunities and budgeting capital.
3. Understand the various costs of capital and calculate these costs.
4. Recognize the significance of capital structure and examine its importance in decision making along with dividends and working capital.
5. Understand the concept and stages in project management.

Course Outcomes (COs)

At the end of the course, Students would be able to

CO1. Learn financial accounting concepts and analyze data.
CO2. Understand the role of capital budgeting in decision making.
CO3. Apply the concepts of capital structure in financial decision making.
CO4. Applications of Project management.
CO5. Appreciate Risk Management concepts

UNIT-I: A) Introduction to Financial Accounting

Definition, branches of accounting, accounting concepts and conventions, types and principles of accounting, accounting cycle, journal, ledger and Trial Balance and final accounts (simple problems) and types of financial statement analysis.

B) Financial Statement Analysis: Introduction, meaning of ratio, steps in Ratio analysis, classification of Ratios. Advantages and Limitation of Ratio analysis, (simple problems).

UNTI-II: Introduction to Financial Management and Capital Budgeting

Concept, functional areas and objectives of financial management. Capital Budgeting- meaning – importance – process –techniques of capital budgeting. Traditional techniques – Payback Period – Accounting / Average Rate of Return, Discounted techniques – discounted Payback Period – Net Present Value – Internal Rate of Return – Profitability Index. (Simple Problems).

UNIT-III: Financing Decision

Concepts and measurement of cost of capital, computation of cost of debt, cost of equity, cost of preference shares, and cost of retained earnings; concept weighted average cost of capital and marginal cost of capital.

Capital Structure: Optimal capital structure, factors influencing the capital structure, financial leverage, operating leverage and combined leverage.

UNIT-IV: Dividend decision and Working Capital Management

Concept, types of dividends, models of dividend theories. Concepts of working capital management, types and components of working capital (cash, marketable securities, receivable management inventory management).

UNIT-V: A) Basics of Project Management: Introduction, need for project management, project management knowledge areas and processes, the project life cycle.
B) Project Risk Management: Introduction, risk, risk management, role of risk management in overall project management, steps in risk management, risk identification, risk analysis, reducing risks.

TEXT BOOKS

1. MY Khan and PK Jain: Financial Management--Text and Problems, Tata McGraw Hill. 2009.
2. Harold Kerzner, "Project Management: A Systems Approach to Planning, Scheduling and Controlling", New Delhi, CBS Publications, 1994.

REFERENCE BOOKS

1. Prasanna Chandra. "Project Planning, Analysis, Selection, Implementation and Review", New Delhi, Tata McGraw Hill Publications, 2000.
2. P. Gopalkrishnan and E. Rama Moorthy. "Text book of Project Management". New Delhi,McGraw Hill Publications, 2000.

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16CS4201 – NEURAL NETWORKS
(PROFESSIONAL ELECTIVE - IV)

IV Year B. Tech. CSE-II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand neural network, models of neuron and knowledge representation
2. Understand learning processes, such as, error correction learning, memory based learning, Hebbian learning and Boltzman learning
3. Understand single layer and multi layer perceptrons and also describe application areas of each of them.
4. Understand the importance of back propagation and self organization maps.
5. Understand neuro dynamics and Hopfiled models.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Describe neural network, models of neuron and knowledge representation
CO2. Describe learning processes, such as, error correction learning, memory based learning, Hebbian learning and Boltzman learning
CO3. Differentiate single layer and multi layer perceptrons and also describe application areas of each of them.
CO4. Highlight the importance of back propagation and self organization maps.
CO5. Explain neuro dynamics and Hopfiled models.

UNIT I

INTRODUCTION - What is a neural network? Human Brain, Models of a Neuron, Neural networks viewed as Directed Graphs, Network Architectures, Knowledge Representation, Artificial Intelligence and Neural Networks (p. no's 1 –49)

LEARNING PROCESS 1 – Error Correction learning, Memory based learning, Hebbian learing, (50-55)

UNIT II

LEARNING PROCESS 2: Competitive, Boltzmann learning, Credit Assignment Problem, Memory, Adaption, Statistical nature of the learning process, (p. no's 50 –116)

SINGLE LAYER PERCEPTRONS – Adaptive filtering problem, Unconstrained Organization Techniques, Linear least square filters, least mean square algorithm, learning curves, Learning rate annealing techniques, perception –convergence theorem, Relation between perception and Bayes classifier for a Gaussian Environment (p. no's 117 –155)

UNIT III

MULTILAYER PERCEPTRON – Back propagation algorithm XOR problem, Heuristics, Output representation and decision rule, Computer experiment, feature detection, (p. no's 156 – 201)

BACK PROPAGATION - back propagation and differentiation, Hessian matrix, Generalization, Cross validation, Network pruning Techniques, Virtues and limitations of back propagation learning, Accelerated convergence, supervised learning. (p. no's 202 –234)

UNIT IV

SELF ORGANIZATION MAPS – Two basic feature mapping models, Self organization map, SOM algorithm, properties of feature map, computer simulations, learning vector quantization, Adaptive patter classification, Hierarchal Vector quantilizer, contexmel Maps (p. no's 443 –469, 9.1 –9.8)

UNIT V

NEURO DYNAMICS – Dynamical systems, stavility of equilibrium states, attractors, neurodynamical models, manipulation of attractors' as a recurrent network paradigm (p. no's 664 –680, 14.1 –14.6)

HOPFIELD MODELS – Hopfield models, computer experiment I (p. no's 680-701, 14.7 – 14.8)

TEXT BOOK:

1. Neural networks A comprehensive foundations, Simon Hhaykin, Pearson Education 2nd Edition 2004

REFERENCE BOOKS:

1. Artificial neural networks - B.Vegnanarayana Prentice Halll of India P Ltd 2005.
2. Neural networks in Computer intelligence, Li Min Fu TMH 2003.
3. Neural networks James A Freeman David M S kapura Pearson Education 2004.

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16CS4202 – MACHINE LEARNING
(Professional Elective- IV)

IV Year B. Tech. CSE-II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand concept learning and general to specific ordering techniques of machine learning to solve problems
2. Understand decision tree learning and artificial neural networks to solve problems
3. Understand evaluation of hypothesis and implement Bayesian learning technique
4. Understand computation learning theory and instance based learning to solve problems
5. Understand genetic learning and reinforcement learning and their application to various problems

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Apply concept learning and general to specific ordering techniques of machine learning to solve problems
CO2. Use decision tree learning and artificial neural networks to solve problems
CO3. Implement evaluation of hypothesis and implement Bayesian learning technique
CO4. Use computation learning theory and instance based learning to solve problems
CO5. Describe genetic learning and reinforcement learning and their application to various problems

UNIT-I

Introduction: Well proposed Learning Problems, Designing a Learning System, perspectives and Issues in Machine Learning.

Concept Learning and General - to - Specific ordering: Introduction, A concept learning Task, Concept learning as Search, Find-S, Version Spaces And Candidate -Elimination Algorithms, Remarks, Inductive Bias.

UNIT-II

Decision Tree Learning: Introduction, Decision Tree Representation, Problems for Decision Tree Learning, Basic Decision Tree Learning Algorithms, Inductive Bias in Decision Tree Learning, Issues in Decision Tree Learning.

Artificial Neural Network: Neural Network Representation, Problems for Neural Networks, Perceptrons, Multilayer and Back Propagation Algorithm , Remarks on Back Propagation Algorithm, Face Recognition example.

UNIT-III

Evaluating Hypothesis: Estimating Hypothesis Accuracy, basics of Sampling Theory, General Approach for Deriving Confidence Intervals, Difference in Error of Two Hypothesis, Comparing Learning Algorithms.

Bayesian Learning: Introduction, Bayes theorem, Bayes theorem and Concept Learning , Maximum Likelihood and Least-Squared Error Hypothesis, Maximum Likelihood for Predicting Probabilities, Minimum Description Length Principle, Bayes Classifier, Gibbs algorithm, Naïve Bayes Classifier, Bayesian Belief Networks, EM Algorithm

UNIT-IV

Computation Learning Theory: Probably Learning an Approximately Correct Hypothesis, Sample Complexity for Finite Hypothesis Space, Sample Complexity for Infinite Hypothesis Space, Mistake Bound model for Learning.

Instance Based Learning: K-Nearest Neighborhood Learning, Locally Weighted Regression, Radial basis function, Case Based reasoning.

UNIT-V

Genetic Learning: Introduction, Genetic Algorithms, Hypothesis Space Search, Genetic Programming, Models of Evolution & Learning, Parallelizing Genetic Algorithms.

Reinforcement Learning: Introduction, learning task, Q Learning, Non-Deterministic Actions & rewards, temporal different learning, Generalizing from Examples, Relation to Dynamic Programming

TEXT BOOK(S)

1. Machine Learning, Tom Mitchell, McGraw Hill, 1997.

REFERENCE BOOK(S)

1. The Elements of Statically Learning, Trevor Has tie, Robert Tibshirani & Jerome Friedman, Springer Verlag, 2001
2. Machine Learning Methods in the Environmental Sciences, Neural Networks, William W Hsieh, Cambridge Univ Press.
3. Pattern classification, Richard o. Duda, Peter E. Hart and David G. Stork, John Wiley & Sons Inc., 2001.
4. Neural Networks for Pattern Recognition, Chris Bishop, Oxford University Press, 1995.

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16CS4203 – HUMAN COMPUTER INTERACTION
(PROFESSIONAL ELECTIVE - IV)

IV Year B. Tech. CSE-II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.
2. Recognize how a computer system may be modified to include human diversity
3. Be aware of mobile HCI
4. Learn the guidelines for user interface.

Course Outcomes (COs)

After completion of the course, student would be able to

CO1. Design effective dialog for HCI
CO2. Design effective HCI for individuals and persons with disabilities
CO3. Assess the importance of user feedback
CO4. Explain the HCI implications for designing multimedia/ ecommerce/ e-learning Web sites
CO5. Develop meaningful user interface.

UNIT I: FOUNDATIONS OF HCI

The Human: I/O channels – Memory – Reasoning and problem solving; The computer: Devices – Memory – processing and networks; Interaction: Models – frameworks – Ergonomics – styles – elements – interactivity- Paradigms.

UNIT II: DESIGN & SOFTWARE PROCESS

Interactive Design basics – process – scenarios – navigation – screen design – Iteration and prototyping. HCI in software process – software life cycle – usability engineering – Prototyping in practice – design rationale. Design rules – principles, standards, guidelines, rules. Evaluation Techniques – Universal Design.

UNIT III: MODELS AND THEORIES

Cognitive models –Socio-Organizational issues and stake holder requirements –Communication and collaboration models

UNIT IV: MOBILE HCI

Mobile Ecosystem: Platforms, Application frameworks- Types of Mobile Applications: Widgets, Applications, Games- Mobile Information Architecture, Mobile 2.0, Mobile Design: Elements of Mobile Design, Tools.

UNIT V: WEB INTERFACE DESIGN

Designing Web Interfaces – Drag & Drop, Direct Selection, Contextual Tools, Overlays, Inlays and Virtual Pages, Process Flow.

TEXT BOOK(S)

1. Human Computer Interaction, Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, 3rd Edition, Pearson Education, 2004
2. Mobile Design and Development, Brian Fling, 1st Edition, O"Reilly Media Inc., 2009
3. Designing Web Interfaces, Bill Scott and Theresa Neil, 1st Edition, O"Reilly, 2009.

REFERENCE BOOK(S)

1. Laurel, B , S. Joy Mountford, The art of human-computer interface design, Addison-Wesley Publishing Company, Inc.,
2. Jenny Preece, HelenSharp, David Benyon, Simon Holland and Tom Carey, Human-computer interaction, Addison-Wesley Publishing Company, Inc

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16CS4204 – INTERNET OF THINGS
(PROFESSIONAL ELECTIVE - IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives
Develop ability to

1. Understand definition, design and characteristics of internet of things
2. Understand the similarities and dissimilarities between IoT and M2M
3. Use python programming language to write programs
4. Understand various IoT physical devices and endpoints
5. Understand the suitability of IoT physical servers and cloud offerings for any given problem.

Course Outcomes (COs)
After completion of the course, student would be able to

CO1. Describe definition, design and characteristics of internet of things
CO2. Highlight the similarities and dissimilarities between IoT and M2M
CO3. Write programs using python programming language
CO4. Describe various IoT physical devices and endpoints
CO5. Highlight the suitability of IoT physical servers and cloud offerings for any given problem.

UNIT I
Introduction to Internet of Things –Definition and Characteristics of IoT, Physical Design of IoT– IoT Protocols, IoT communication models, Iot Communication APIs IoT enabaled Technologies – Wireless Sensor Networks, Cloud Computing, Big data analytics, Communication protocols, Embedded Systems, IoT Levels and Templates Domain Specific IoTs – Home, City, Environment, Energy, Retail, Logistics, Agriculture, Industry, health and Lifestyle

UNIT II
IoT and M2M – Software defined networks, network function virtualization, difference between SDN and NFV for IoT Basics of IoT System Management with NETCOZF, YANG- NETCONF, YANG, SNMP NETOPEER

UNIT III
Introduction to Python - Language features of Python, Data types, data structures, Control of flow, functions, modules, packaging, file handling, data/time operations, classes, Exception handling Python packages - JSON, XML, HTTPLib, URLLib, SMTPLib

UNIT IV
IoT Physical Devices and Endpoints - Introduction to Raspberry PI-Interfaces (serial, SPI, I2C) Programming – Python program with Raspberry PI with focus of interfacing external gadgets, controlling output, reading input from pins.

UNIT V

IoT Physical Servers and Cloud Offerings – Introduction to Cloud Storage models and communication APIs Webserver – Web server for IoT, Cloud for IoT, Python web application framework Designing a RESTful web API

TEXT BOOK(S)

1. Internet of Things - A Hands-on Approach, Arshdeep Bahga and Vijay Madisetti, Universities Press, 2015, ISBN: 9788173719547
2. Getting Started with Raspberry Pi, Matt Richardson & Shawn Wallace, O'Reilly (SPD), 2014, ISBN: 9789350239759

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16MB4251 – ENTREPRENEURSHIP
(OPEN ELECTIVE-IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre requisites: None

Course Objectives

Develop ability to

1. Understand the mindset of the entrepreneurs.
2. Analyze the financial aspects of establishing an enterprise.
3. Learn entrepreneurial activities and determine strategies for launching.
4. Identify the challenges of entrepreneurship and develop an idea on the entrepreneurial framework.
5. Apply strategic perspectives in entrepreneurship.

Course Outcomes (COs)

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

CO1. Explore and identify the entrepreneurial traits.
CO2. Identify various funding agencies and role of IPR.
CO3. Imagine and identify opportunities to launch new ventures.
CO4. Address entrepreneurial challenges.
CO5. Develop strategies for bringing stability and growth in business.

UNIT-I: Introduction to Entrepreneurship

Meaning, importance, entrepreneurship characteristics, women entrepreneurs, classifications of entrepreneurs, myths of entrepreneurship, qualities of entrepreneurship, competencies, attitude function and nature of forms of entrepreneurship.

UNIT-II: Promotion and financial aspects of entrepreneurship

Idea generation- opportunities- SWOT analysis, patents and trademark, intellectual property rights, source of capital, debt capital, seed capital, venture capital- informal agencies in financing entrepreneurs. Government grants and subsidies, types of investors and private offerings.

UNIT-III: Launching entrepreneurial ventures

Opportunities identification- entrepreneurial imagination and creativities – the nature of the creativity process innovation and entrepreneurial- methods to initiate venture creating, new ventures-acquiring and established entrepreneurial venture, franchising hybrid-disadvantage of franchising.

UNIT-IV: Legal challenges of entrepreneurship

Intellectual property protection patents, copy rights-trademarks and trade secret. Avoiding pitfalls-formulation of the entrepreneurial plan-the challenges of new venture startups-poor financial understanding-critical factors for new venture development, the evaluation process, feasibility criteria approach.

UNIT-V: Strategic perspectives in entrepreneurship

Strategic planning-strategic actions-strategic positioning-business stabilization-building the adoptive firms-understanding the growth stage unique managerial concern of growing ventures.

TEXT BOOKS

1. D F Kuratko and T V Rao "Entrepreneurship- A South - Asian Perspective "Cengage Learning, 1/e, 2012.
2. Vasanth Desai "Small Scale industries and entrepreneurship" Himalaya Publishing 2012.

REFERENCE BOOKS

1. B. Janakiram and M. Rizwana "Entrepreneurship Development: Text & Cases, Excel Books, 2011.
2. Stuart Read, Effectual Entrepreneurship, Routledge, 2013.
3. Nandan H, Fundamentals of Entrepreneurship, PHI, 2013.

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16EE4253 – RENEWABLE ENERGY SOURCES
(OPEN ELECTIVE-IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisites: None

Course Objectives

Develop ability to

1. Understand the basic concepts of solar energy
2. Understand the methods of storage of solar energy
3. Understand basic concepts of wind energy, biomass energy.
4. Understand basic concepts of geothermal energy and ocean energy
5. Understand the need of direct energy conversion.

Course Outcomes (COs)

At the end of the course student would be able to

CO1. Get thorough knowledge on various types of renewable energy sources
CO2. Develop storage systems of solar energy for different applications.
CO3. Get thorough knowledge on hybrid energy systems
CO4. Get thorough knowledge on principles of direct energy conversion
CO5. Apply the above conceptual things to real world electrical and electronic problems

UNIT-I

Principles of solar radiation: Role and potential of new and renewable source, the solar energy option, Environmental impact of solar power, physics of the sun, the solar constant, extraterrestrial and terrestrial solar radiation, solar radiation on titled surface, Instruments for measuring solar radiation and sun shine, solar radiation data.

UNIT-II

Solar Energy Collection, Storage & Applications:

Collection: Flat plate and concentrating collectors, classification of concentrating collectors, orientation and thermal analysis, advanced collectors.

Storage & Applications: Different methods, sensible, latent heat and stratified storage, solar ponds. Solar applications - solar heating / cooling technique, solar distillation and drying, photovoltaic energy conversion.

UNIT -III

Wind Energy: Sources and potentials, horizontal and vertical axis windmills, performance characteristics, Bertz criteria.

Bio-mass: Principles of Bio-conversion, Anaerobic/aerobic digestion, types of Bio-gas digesters, gas yield, combustion characteristics of bio-gas, utilization for cooking, I.C Engine operation and economic aspects.

UNIT- IV

Geothermal Energy: Resources, types of wells, methods of harnessing the energy, potential in India.

Ocean Energy: OTEC, Principles utilization, setting of OTEC plants, thermodynamic cycles. Tidal and wave energy: Potential and conversion techniques, mini-hydel power plants and their economics.

UNIT-V

Direct Energy Conversion: Need for DEC, Carnot cycle, limitations, and principles of DEC.

TEXT BOOKS

1. Non-Conventional Energy Sources, G.D.Rai, Khanna Publishers.
2. Introduction to renewable energy, Vaughn Neison, CRC Press (Taylor & Francis)

REFERENCE BOOKS

1. Renewable Energy Resources, Twidell & Wier, CRC Press (Taylor & Francis)
2. Renewable Energy sources and Emerging Technologies, D.P. Kothari, K.C Singal, Rakesh Ranjan, PHI Learning Private Limited.
3. Fundamentals of Renewable Energy systems, D. Mukherjee, S. Chakrabarty, New age International.
4. Renewable Energy Power for a sustainable Future, Godfrey Boyle, Oxford University Press.

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16EC4254 – BIOMEDICAL INSTRUMENTATION
(OPEN ELECTIVE-IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Note: No detailed mathematical treatment is required and only elementary treatment is sufficient.

Course Objectives

Develop ability to

1. Learn the basics of human physiology
2. Understand the basics of bio-medical transducers and recorders.
3. Understand the applications of measuring, recording and monitoring instruments.
4. Understand the concepts of various medical instruments
5. Understand the concepts of various supporting systems.

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

CO1. Explain the functioning of different human physiological systems.
CO2. Explain the operations of transducers and recorders used for bio-medical applications.
CO3. Explain the principles of medical imaging systems.
CO4. Explain the principles of monitoring instruments used for bio-medical application
CO5. Explain the need for health supporting systems

UNIT I - Human Physiology

Introduction to generalized medical instrumentation system, components of instrumentation system, physiological system of human body, cardiovascular system. Respiratory system, Nervous system, generation of bioelectric potentials, Action potential, resting potential, Neuronal communication.

UNIT II - Bio- Potential Electrodes, Transducers And Recorders

The electrode – electrolyte interface, Polarization, Ag/Agcl Electrodes, Body surface electrodes, Internal Electrodes. Transducers in general, PressureTransducers, Temperature transducers, pulse sensors, Basic recording systems.

UNIT III - Medical Imaging Systems

Basics of medical imaging systems, block diagrams and applications of - X-ray machine, Computer Tomography, Magnetic Resonance Imaging systems, Ultrasonic Imaging systems.

UNIT IV - Monitoring Systems

Basic principles of -Stethoscope, BP measuring Instrument, Electrocardiography(ECG), Electroencephalography(EEG) and Electromyography(EMG) recorders,

UNIT V - Supporting Systems

Basic principles of Pacemaker system, Transcutaneous Electrical Nerve stimulation (TENS), surgical diathermy, Heart lung machine, Hemo Dialysis, Lithotripsy.

TEXT BOOKS

1. Bio-Medical Instruments and Measurements, Cromwell, Prentice Hall of India, 1990.
2. Bio-Medical Instrumentation, Dr.Arumugam, Anuradha Agencies, 1994.

REFERENCE BOOKS

1. Bio-Medical Electronics & Instrumentation, Prof.Venkataram.S.K, Galgotia Publications, 2000.
2. Introduction to Bio Medical Equipment Technology, John. Can. Brown, Pearson Education of ASIA, 2001.
3. Hand book of Bio-Medical Instrumentation, Khandpur.R.S, Tata McGraw –Hill, 1987

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16ME4255 – MATERIALS HANDLING
(OPEN ELECTIVE-IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Pre-requisites: None.

Course Objectives
Develop ability to
1. Know the working principle of earth moving equipment
2. Study types and working principle of conveying and hoisting equipment
3. Understand the working principle of concrete producing, concrete screening and concrete mixing equipment
4. Know the principle of pneumatic equipment and tools

Course Outcomes (COs)
At the end of the course, the student will be able to:
CO1. Understand the basics of material handling systems by using earth moving equipments.
CO2. Understand working principles of various conveying systems used in industries.
CO3. Understand the process of aggregating the materials with crushers and screens.
CO4. Understand the working principles of pneumatic equipments.
CO5. Apply the various methods for cost minimization along with maintenances

UNIT-I: Introduction: Material handling principles; material handling equipment and material handling systems.

Earth moving and Excavation Equipment-Shovels, Dragline, Clam shell, Cable Excavator, Bucket Wheel Excavator, Tractor, Bull - dozer, Scraper, Earth compactors.

UNIT-II: Conveying Equipment: Belt Conveyor, Screw Conveyor, Bucket Conveyor, Aerial ropeway,

Hoisting Equipment: Hoist Winch, Differential and Worm geared chain hoists. Fork lift truck, Guyed derricks, Swing and non -swing mobile crane, Whirler crane, Tower crane.

UNIT-III: Aggregate and Processing Equipment: Crushers, Jaw, Gyratory, Hammer and Roll crushers; Screens: Stationary, Revolving, Shaking and Vibrating screens. Concrete mixers, Concrete pump. .

UNIT –IV: Pneumatic Equipment: Reciprocating air-compressor. Construction of pneumatic tools: Jack hammer, Paving breaker, Concrete vibrator and miscellaneous equipments.

UNIT-V: Cost minimization & Maintenance:
Cost minimization methods of material handling- Maintenance of Material Handling Equipments, Safety in material handling, Ergonomics of Material Handling equipment.

TEXT BOOKS

1. Construction Planning, Equipment and Methods, Peurifoy R.L, McGraw Hill 6th Edn., 2008.
2. Building and Civil Engineering Plant, Spence G and Wood C.L, John -Wiley & Sons, 2nd Edn., 2004.
3. Construction Equipment & its Planning & Application, Mahesh Varma Dr, Metropolitan Book Co., 3rdEdn., 2009

REFERENCE BOOKS

1. Operations Management PB Mahapatra, PHI, January 2010.
2. Plant Layout and Material Handling, James M. Apple, John Wiley & Sons.2013.
3. Plant Layout and Material Handling, Fred E. Meyers, Prentice Hall, 25 January 1993.

GEETHANJALI COLLEGE OF ENGINEERING AND TECHNOLOGY (Autonomous)
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Cheeryal (V), Keesara (M), Medchal Dist., Telangana - 501 301

16CE4256 – DISASTER MITIGATION AND MANAGEMENT
(OPEN ELECTIVE-IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None.

Course Objectives:
Develop ability to
1. Acquire knowledge on disasters and assess their impact.
2. Comprehend the monitoring techniques of disasters
3. Understand the issues and policies involved in the disaster management.
4. Evaluate the pre-disaster risk and vulnerability reduction strategies.
5. Assess the role of NGO's, Government bodies and Public in the disaster mitigation and Management.

Course Outcomes:
At the end of the course, student would be able to
CO1. Explain the different types of disasters.
CO2. Evaluate the impact of disasters on the community.
CO3. Suggest a suitable monitoring technique for disasters.
CO4. Recommend appropriate vulnerability reduction strategy and risk reducing techniques.
CO5. Estimate the disaster infrastructure development and role of NGO's, Government bodies and Public in the disaster mitigation and management.

UNIT–I
Introduction: Meaning and Concept of Environmental hazards, Environmental Disasters and Environmental stress. Different approaches and relation with human Ecology - Landscape Approach – Ecosystem Approach – Perception approach – Human ecology and its application in geographical researches.

UNIT–II
Types of Environmental hazards & Disasters: Natural and Man induced. Natural Hazards – Planetary Hazards/ Disasters – Extra Planetary Hazards/ disasters – Planetary Hazards – Endogenous Hazards – Exogenous Hazards.

UNIT–III
Endogeneous Hazards/ Disasters: Volcanos – Earthquakes - Landslides – Earthquake Hazards/ disasters – Causes of Earthquakes – Distribution of Earthquakes – Hazardous effects of earthquakes – Earthquake Hazards in India – Human adjustment, perception & mitigation of earthquake.

UNIT–IV
Exogenous Hazards/ Disasters: Infrequent events – Cumulative atmospheric hazards/ disasters.
Infrequent events: Cyclones – Lightning – Hailstorms.
Cyclones: Tropical cyclones & Local storms – Destruction by tropical cyclones & local storms (causes, distribution, human adjustment, perception & mitigation)

Cumulative Atmospheric Hazards/ Disasters: Floods – Droughts – Cold waves – Heat waves.
Floods: Causes of floods – Flood hazards – Flood control measures (Human adjustment, perception & mitigation).
Droughts: Impacts of droughts – Drought hazards in India – Drought control measures.
Extra Planetary Hazards/ Disasters – Man induced Hazards/ Disasters – Physical hazards/ Disasters – Soil Erosion.
Soil Erosion: Mechanics & forms of Soil Erosion – Factors & causes of soil erosion – Conservation measures of Soil Erosion.
Chemical Hazards/ Disasters: Release of toxic chemicals, nuclear explosion – Sedimentation processes:- Global Sedimentation problems – Regional Sedimentation problems – Sedimentation & Environmental problems – Corrective measures of Erosion & Sedimentation.
Biological hazards/ disasters: Population Explosion.

UNIT–V
Emerging approaches in Disaster Management – Three Stages

1) Pre-disaster stage (preparedness)
2) Emergency Stage
3) Post Disaster stage – Rehabilitation

TEXT BOOKS

1. Manual on National Disaster Management Plan, National Disaster Management Authority, Ministry of Home affairs, Government of India (http://ndma.gov.in/images/policyplan/dmplan/National%20Disaster%20Management%20Plan%20May%202016.pdf)
2. Disaster Management, Dr. Mrinalini Pandey, Wiley India Pvt Ltd., 2014.
3. Disaster Science and Management, Tushar Bhattacharya, McGraw Hill Education, 2015.

REFERENCE BOOKS

1. Disaster Mitigation: Experiences and Reflections, Pardeep Sahni, PHI Learning, 2010.
2. Natural Hazards and Disasters, Donald Hyndman and David Hyndman, Cengage Learning, 2013.
3. Disaster Management Global Challenges and Local Solutions, Rajib, S and Krishna Murthy, R.R, Universities Press Hyderabad, 2012.
4. Earth and Atmospheric Disaster Management: Nature and Manmade, Navale Pandharinath & C.K. Rajan, B.S. Publications, Hyderabad, 2009.
5. Disaster Risk Reduction in South Asia, Sahni and Pardeep, PHI learning Pvt Ltd, 2003.

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16MA4257 – ACTUARIAL STATISTICS
(OPEN ELECTIVE-IV)

IV Year. B.Tech. CSE – II Sem

L	T	P/D	C
3	-	-/-	3

Prerequisite(s): None

Course Objectives

Develop ability to

1. Determine present and future values of investment projects, annuities and be able to compute outstanding principal (capital) as well as interest using loan schedules.
2. Provide a motivation, based on a normative theory of individual behavior in the face of uncertainty, for the study of insurance models.
3. Measure the number of deaths (in general, or due to a specific cause) in a particular population, scaled to the size of that population, per unit of time.
4. Understand benefits of life insurance, various insurance policies, payments and premiums.
5. Predict future trends and patterns in the data behavior of processes or metrics over a period of time using time series models. Fit a model and proceed to forecasting and monitoring.

Course Outcomes (COs)

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

CO1. Assess financial loss and profit of an organization or in any business, shares.
CO2. Apply an economic theory that explains the mathematical expectation of the insured loss and profit.
CO3. Organize to assess various risks involved in terms of mortality, claims which can be received, profitability analysis for organization and individuals.
CO4. Analyze Life Insurance policies, Pension plans and Health Care Plans.
CO5. Apply time series models in Economic, Sales, Weather forecasting, Budgetary and stock market analysis, Inventory and Utility studies etc.

UNIT-I : Financial mathematics

Rate of Interest;Normal and effective rates of interest and discount; Accumulated Value; Present value of cash flows; Valuing Cash Flows; Present Value Principals of compound interest; force of interest and discount compound interest; Annuities certain; Deferred annuities, Concepts of different annuities, annuities due, Redemption of Loans, Sinking Funds and Capital redemption assurance.

UNIT-II : Utility Theory

Insurance and Utility Theory; Models for Individual Claims and their sums; Approximations for the distribution of Sums; Application to Insurance; Survival function Time until-death for a person age x; Curate future life time.

UNIT-III : Mortality

Functions and laws of mortality tables; Select ultimate and aggregate mortality tables; Functions other than yearly policy Values; Surrender values and paid up Values; Bonus Special policies; Joint life and last survivor statuses; The Mortality tables.

UNIT-IV : Life Insurance and Premiums

Insurance payable at the moment's of death and at the end of the year of death-level benefit insurance; endowment insurance; differed insurance and varying benefit insurances; recursions; commutation functions; Single payment.Net Premiums and Net Premium Reserves of insurance policies; Insurance policies with expenses and bonuses introduced; Gross premiums and Gross premium reserves of insurance policies.

UNIT-V : Time Series Analysis and Forecasting

Basic concepts of Time Series Analysis; Components of Time Series: Moving Averages, Exponential Smoothing, Autoregressive and Partial Autoregressive Functions; Forecasting Models: Moving/Autoregressive Moving Averages (MA,AR,ARMA and ARIMA); Prediction limits, Forecast Updating and Holt-Winter's Methods; Box-Jenkins Method of modeling.

TEXT BOOKS

1. Actuarial Mathematics society of Actuaries, Itasca, IIIinos, USA Second Edition (1997), Newton.L.Bower, JR. Hanes.U. Gerber, James .C.Hickman, Donald. A.Jones and Cecil .J.Nesbitt (1986).
2. Actuarial Statistics: An Introduction Using R (2009) by Shailaja R. Deshmukh, Universities Press; Third edition

REFERENCE BOOKS

1. Introduction to Time Series Analysis and Forecasting, Cheryl L. Jennings, Douglas C. Montgomery, and Murat Kulahci
2. An Introduction to Actuarial Mathematics, Springer-Science+Bussiness Media Dordrecht (2002),A.K.Gupta and T.Varga.
3. Fundamentals of Actuarial Mathematics, Second Edition, S. David Promislow
4. Life Contingencies, Spurgeon E.T. (1972), Cambridge University Press
5. Time series analysis, forecasting and control Book by George E. P. Box