BHARATHIAR UNIVERSITY, COIMBATORE – 641 046

Department of Computer Science

M. Sc. COMPUTER SCIENCE (CBCS-UD)

2018-19 batch & onwards

Semester: III

II Year M.Sc. Computer Science (2018-2019 batch)

SCHEME OF EXAMINATIONS

Core/ Elective/ General/ General Supportive	**Suggested Code**	**Sem.**	**Title of the Paper**	**No. of Credits**		**Hrs.**		**Marks**
				Theory	Practical	L	P	
Core 11	19CS3C1	III	Wireless Networks	2	2	2	4	100
Core 12	19CS3C2	III	Visual Programming	2	2	2	4	100
Core 13	19CS3C3	III	Software Project Management	4	0	4	0	100
Core 14	19CS3C4	III	Cloud Computing	4	0	4	0	100
Core 15	19CS3C5	III	Big Data Analytics	2	2	2	4	100
Elective -III	19CS3EXX	III	Elective –III	4	0	4	0	100
PDC 3	19CS3PDC1	III	Software Installation	0	1	-	-	25
General	19CS3G1	III	Gap Analysis	0	1	-	-	25
General Supportive	19CSGSXX	III	General Supportive – III	2	0	2	0	50
Project	16CSPRO	IV	Project work	9				225
Total				37				925

WIRELESS NETWORKS

Subject Code: 19CS3C1 **Number of Credits: L P T**
2 2 4

Preamble

The course presents Wireless Sensor Networks (WSNs), technology that continues developing after more than 10 years. Even though research is vast, WSN technology is not stable yet. The course shows different protocols proposed for WSNs in different layers of the OSI model. The course analyses advantages and disadvantages of those protocols and their usefulness and performance in different applications. This way, the student witnesses the creation of a communication technology as an evolution of different previous technologies.

Prerequisite

To introduce the students to state of the art wireless network conventions and models.

Course Outcome:

CO1	To understand the basic WSN technology and supporting protocols, with emphasis place on standardization basic sensor systems and provide a survey of sensor technology.	Understand
CO2	Understand the medium access control protocols and address physical layer issues.	Understand/ Analyse
CO3	Learn key routing protocols for sensor networks and main design issues.	Understand/ Analyse
CO4	Learn transport layer protocols for sensor networks, and design requirements.	Understand/ Analyse / Apply
CO5	Understand the Sensor management, sensor network middleware, operating systems.	Understand/ Analyse / Apply

Mapping with Programme Outcomes:

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	S				S							L
CO2	S				S					M	L	
CO3	S				S					M	M	
CO4	S	M	S	L								
CO5	S	S								S	L	M

S- Strong; M-Medium; L-Low

Assessment Pattern:

Bloom's Category	Continuous Assessment Test (%)			Terminal Examination
	1	2	3	
Remember	20	20	30	20
Understand	30	30	20	30
Apply	30	30	30	20
Analyse	20	20	20	30
Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Wireless Networks(CO1)

1. Write a note on Evolution of wireless networks.
2. List some network challenges.
3. What is an analog and digital data transmission?
4. Discuss about multiple techniques access in wireless network.

Introduction about Wireless LAN(CO2)

1. What is WLAN?
2. List types of WLAN technologies.
3. Illustrate the IEEE 802.11 standards.
4. What are the functions of MAC layer in IEEE 802.11?

Wireless Personal Area Networks(CO3)

1. Define Bluetooth.
2. Explain the protocol stock in WPAN?
3. Describe about Zigbee architecture.
4. Write a note on Network topologies.

Ad-hoc Wireless Networks(CO4)

1. What are the characteristics and features of Ad-hoc network?
2. List the design goal of MAC protocol for ad-hoc networks.
3. Define DSDV.
4. Explain on demand routing protocol in detail.

Wireless Sensor Networks(CO5)

1. State some application of WSN.
2. What are the components of WSN?
3. Discuss about the major issues and challenges that need to consider while designing WSN.
4. Describe the Network Architecture.

Syllabus:

Unit -I: Wireless Networks: Evolution of wireless networks – Challenges - Transmission fundamentals: Analog and digital data transmission - Transmission media - Modulation techniques for wireless systems - Multiple access for wireless systems - Performance increasing techniques for wireless networks.

Unit -II: Wireless LAN:Introduction to Wireless LANs – WLAN Equipment, Topologies, Technologies, IEEE 802.11 WLAN – Architecture and Services - Physical Layer - MAC Sub Layer –MAC Management Sub Layer, Other IEEE 802.11 Standards.

Unit -III: Wireless Personal Area Networks:Introduction – Bluetooth: Architecture - Protocol Stack - Physical Connection – Mac mechanism – Frame format – Connection management –Low Rate and High Rate WPAN, ZigBee Technology IEEE 802.15.4: Components – Network topologies – PHY – MAC.

Unit -IV: Ad-hoc Wireless Networks: Introduction- Characteristics of Adhoc Networks - Classifications of MAC Protocols: Connection Based protocols, Reservation Mechanism - Table driven Routing protocols: DSDV, WRP - On Demand routing protocols: DSR,AODV,TORA –Routing Protocol with Efficient Flooding Mechanism: OLSR - Hierarchical routing protocols – CBRP, FSR.

Unit -V: Wireless Sensor Networks: Introduction - Challenges for wireless sensor networks - Comparison of sensor network with ad-hoc network - Single node architecture: Hardware components - Energy consumption of sensor nodes - Network architecture: Sensor network scenarios - Design principles – Operating systems.

Reference Books:

1. Nicopolitidis P, Obadiah M S, Papadimitriou G S and Pomportsis A S, “Wireless Networks”, John Wiley and Sons, New York, 2009.

2. Vijay K Garg, Wireless Communication and Networking, Morgan Kaufmann Publishers 2010.

3. Siva Ram Murthy C.,Manoj B S, “Ad Hoc Wireless Networks: Architectures and Protocols”, Prentice Hall, 2006.

4. Holger Karl and Andreas Willig, “Protocol and Architecture for Wireless Sensor Networks”, John Willey Publication, 2011.

Course content and lecture schedule:

Module no	Topic	No of Lectures
1	**Wireless Networks**	
1.1	Evolution of wireless networks	1
1.2	Challenges & Transmission fundamentals	1
1.3	Analog and digital data transmission	1
1.4	Transmission media & Modulation techniques for wireless systems	2
1.5	Multiple access for wireless systems	1
1.6	Performance increasing techniques for wireless networks.	1
2	**Wireless LAN**	
2.1	Introduction to Wireless LANs	1
2.2	WLAN Equipment, Topologies, Technologies, IEEE 802.11 WLAN	3
2.3	Architecture and Services	1
2.4	Physical Layer & MAC Sub Layer	1
2.5	MAC Management Sub Layer, Other IEEE 802.11 Standards.	2
3	**Wireless Personal Area Networks**	
3.1	Introduction to Bluetooth & Architecture	1
3.2	Protocol Stack	1
3.3	Physical Connection	1
3.3	Mac mechanism	1
3.4	Frame format	1
3.5	Connection management	1
3.6	Low Rate and High Rate WPAN, ZigBee Technology IEEE 802.15.4: Components	2
3.7	Network topologies – PHY – MAC.	2
4	**Ad-hoc Wireless Networks**	
4.1	Introduction- Characteristics of Adhoc Networks	1
4.2	Classifications of MAC Protocols: Connection Based protocols, Reservation Mechanism	3
4.3	Table driven Routing protocols: DSDV, WRP	1
4.4	On Demand routing protocols: DSR, AODV, TORA	2

4.5	Routing Protocol with Efficient Flooding Mechanism: OLSR Hierarchical routing protocols – CBRP, FSR.	2
5	**Wireless Sensor Networks**	
5.1	Introduction - Challenges for wireless sensor networks	1
5.2	Comparison of sensor network with ad-hoc network	3
5.3	Single node architecture: Hardware components	2
5.4	Energy consumption of sensor nodes	2
5.5	Network architecture: Sensor network scenarios	1
5.6	Design principles – Operating systems.	2
TOTAL		**45**

Course Prepared by: Dr.P.B.Pankajavalli

Course Verified by: Dr.E.Chandra

VISUAL PROGRAMMING

Subject Code: 19CS3C2 **No. of Credits L P T**
2 2 4

Preamble:

The main objective of this course is to provide in depth knowledge on VB.NET, ASP.NET and Web services to students and making them to develop dynamic web applications, websites and web services. The course covers the .NET framework, .NET features, .NET libraries, Basic of VB.NET, Looping statements, Applying OOPs concepts, arrays, exceptions handling and delegates. This paper also focuses on creating window application using window controls, deploying an application, graphics. The second part of this paper also train the students to enrich their knowledge in ASP.NET, web controls, custom controls, data management with ADO.NET, LINQ queries, AJAX application and ASP.NET web services.

Prerequisite:

Basics of VB language and ASP

Course outcomes:

On the successful completion of the course students will be able to

CO1	Understand about .NET framework, .NET features, common language runtime, .NET framework libraries and the Visual Studio Integrated Development Environment.	Remember/Understand
CO2	Write a console application using classes and objects, constructor, overloading, inheritance, polymorphism, interface, array, exceptions, delegates and events	Understand/Apply
CO3	To create a window applications using window controls such as forms, textbox, Buttons, Check boxes, Radio buttons, Panels and Group Boxes, List Boxes, Checked List boxes, Combo boxes and Picture boxes, Scroll bars, Calendar control, Timer control, Menus and graphics.	Apply
CO4	Understand the ASP.NET features, ASP.NET page directives and ADO.NET features	Understand/Remember

CO5	To build the application using Web server Controls, Validation Server Controls, Rich Web Controls, Custom Controls, Collections and Lists.	Apply
CO6	To develop the application using SQL Server with VB.NET and ASP.NET and LINQ queries.	Understand/Apply
CO7	Building ASP.NET 3.5 Enterprise Applications using ASP.NET Ajax applications and ASP.NET web services.	Understand/Analyse/ Apply

Mapping with programme outcomes:

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**M**	**M**										
CO2	**S**	**S**	**S**			**M**						
CO3	**S**	**S**	**S**			**M**			**M**		**S**	
CO4	**M**	**S**										
CO5	**S**	**M**	**S**			**M**			**M**		**S**	
CO6	**S**	**S**	**S**			**M**			**M**		**S**	
CO7	**S**	**S**	**S**			**M**			**M**		**S**	

S- Strong; M-Medium; L-Low

Assessment pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	20	20	20	20
Understand	30	30	30	30
Apply	20	20	20	20
Analyse	20	20	20	20
Evaluate	0	0	0	0
Create	10	10	10	10

Course level assessment questions:

Introduction to .NET (CO1):

1. Describe the .NET framework.
2. What is CLR?
3. List out features of CLR.
4. Explain the features of .NET framework.
5. Write a short note on .NET framework Libraries.

Introduction to VB.NET (CO2):

1. Describe about delegates and Events.
2. Write a windows application to illustrate the use of delegates and events.
3. Briefly explain the looping statement with example.
4. Write a windows application to manipulate strings using any 8 string functions.
5. Briefly explain about array class with its functions and properties.

Creating Windows Applications using basic window controls (CO3):

1. Develop windows application to simulate notepad editor in VB.NET.
2. Create employee registration form using window controls.
3. Explain the properties buttons, checkbox and radio Button.
4. Explain about graphics.
5. Write brief note on handling menus with suitable program.

ASP.NET and ADO.NET Basics (CO4):

1. What are the features of ASP.NET?
2. Explain the ASP.NET page directives.
3. Write note on ADO.NET.
4. Compare ASP with ASP.NET.
5. List out the features of ADO.NET.

ASP.NET Controls (CO5):

1. Explain about collections.
2. Briefly note on validation server controls
3. Write a window application to illustrate the use of custom controls.
4. Explain about list and their properties.
5. Describe about rich web controls.

Data Management with ADO.NET (CO6):

1. What is SQL?
2. Explain the steps in connecting the database with VB.NET application.
3. Explain about LINQ queries.
4. Develop windows applications to extract information from XML document using LINQ.
5. Write a program to insert, delete, and update operations for the student records using VB.NET.

Building ASP.NET Enterprise Applications (CO7):

1. Explain about AJAX controls.
2. What is web service?
3. What are steps in building and registering web services?
4. Explain briefly about ASP.NET web service.
5. Write a program using any THREE AJAX controls in ASP.NET.

Syllabus:

Unit –I: Introduction to .NET – The .NET Framework – Benefits of .NET - Common Language Runtime – Features of CLR - Compilation and MSIL – The .NET Framework libraries – The Visual Studio Integrated Development Environment.

Unit –II: Introduction to VB.NET – VB.NET fundamentals – Branching and Looping Statements - Classes and Objects – Constructors – Overloading- Inheritance and Polymorphism – Interfaces – Arrays – Strings – Exceptions – Delegates and Events.

Unit –III: Building Windows Applications – Creating a Windows Applications using window controls - Windows Forms, Text Boxes, Rich Text boxes, Labels, and link labels – Buttons, Check boxes, Radio buttons, Panels and Group Boxes, List Boxes, Checked List boxes, Combo boxes and Picture boxes, Scroll bars – Calendar control, Timer control – Handling Menus – Dialog boxes – Deploying an Application – Graphics.

Unit- IV: ASP.NET Basics: Features of ASP.NET – ASP.NET page directives - Building Forms with Web server Controls – Validation Server Controls - Rich Web Controls - Custom Controls – Collections and Lists.

Unit –V: Data Management with ADO.NET - Introducing ADO.NET - ADO.NET features - Using SQL Server with VB.NET – Using SQL Server with ASP.NET – LINQ queries – Building ASP.NET 3.5 Enterprise Applications: Developing ASP.NET Ajax applications – ASP.NET web services.

REFERENCES:

1. Jesse Liberty, Programming Visual Basic.NET 2003, Second Edition, O Reilly, Shroff Publishers and Distributors Pvt. Ltd.
2. Steven Holzner, Visual Basic.NET Programming Black Book, 2005 Edition, Paraglyph press USA&Dreamtech Press, India.
3. Bill Evjen, JasonBeres, et al. Visual Basic.NET Programming Bible, 2002 Edition, IDG books India (p) Ltd.
4. MridulaParihar et al., ASP.NET Bible,2002Edition,Hungry Minds Inc, New York, USA. 5. Bill Evjen, Hanselman, Muhammad, Sivakumar& Rader, Professional ASP.NET 2.0, 2006 Edition, Wiley India(p) Ltd.
5. KoGENT Solutions Inc., ASP.NET 3.5 (Covers C# and VB 2008 codes) Black Book, Platinum Edition, Dreamtech press, 2010.

List of Concepts to be covered in Practical:

1. Create a VB.NET window application to compute string manipulation using string class.
2. Design a VB.NET windows application to manipulate stack data structure.
3. Develop a VB.NET windows application to illustrate the mouse events and keyboard events.
4. Simulate text editor in VB.NET.
5. Sending an e-mail using SMTP protocol.
6. Create class library for calculating percentage and grade.
7. Design a VB.NET application and illustrate how to deploy it in local machine.
8. Develop a VB.NET application to extract needed information from xml document using LINQ.
9. Design a VB.NET application to prepare the schedule of programs for November 2015 month using calendar control.
10. Design an ASP.NET application to create advertisements for three companies' products using Ad rotator control.
11. Write an ASP.NET program to illustrate the use of tool bar rich web control with some meaningful application.
12. Design an ASP.NET application to illustrate the use of all validation controls.
13. Design an ASP.NET application to illustrate the user control.
14. Design a VB.NET application for manipulating student database with insert, search and display functions. Use oledb namespace.

15. Design an ASP.NET application for manipulating library database with insert, count and display functions. Use sqlclient namespace.

Course content and lecture schedule:

Module no	Topic	No of Lectures
1	**Introduction to .NET**	
1.1	The .NET Framework	2
1.2	Benefits of .NET	1
1.3	Common Language Runtime	2
1.4	Features of CLR, Compilation and MSIL	1
1.5	The .NET Framework libraries	2
1.6	The Visual Studio Integrated Development Environment	2
2	**Introduction to VB.NET**	
2.1	VB.NET fundamentals	2
2.2	Branching and Looping Statements	2
2.3	Classes and Objects, Constructors, Overloading	2
2.4	Inheritance and Polymorphism	2
2.5	Interfaces, Arrays and Strings	3
2.6	Exceptions	1
2.7	Delegates and Events	2
3	**Building Windows Applications**	
3.1	Creating a Windows Applications using Basic window controls	2
3.2	Calendar control, Timer control	2
3.3	Handling Menus	2
3.4	Dialog boxes	1
3.5	Graphics	2
3.6	Deploying an Application	1
4	**ASP.NET Basics**	

4.1	Features of ASP.NET	1
4.2	ASP.NET page directives	2
4.3	Building web forms with Web server Controls	2
4.4	Validation Server Controls	2
4.5	Rich Web Controls, Custom Controls	2
4.6	Collections and Lists	3
5	**Data Management with ADO.NET**	
5.1	Introducing ADO.NET	2
5.2	ADO.NET features	2
5.3	Using SQL Server with VB.NET	2
5.4	Using SQL Server with ASP.NET	2
5.5	LINQ queries	2
5.6	Building ASP.NET 3.5 Enterprise Application	2
5.7	Developing ASP.NET Ajax applications	2
5.8	ASP.NET web services	3
	Total	**63**

Course Prepared by: Dr. R. Porkodi

Course Verified by: Dr.E.Chandra

SOFTWARE PROJECT MANAGEMENT

Subject Code: **19CS3C3** No. of Credits: L P T

0 0 4

Preamble

The objective of this course is to provide an understanding of software project development. The student should be made to understand the overview of software project management, project planning and Step Wise framework in project planning.The students should be made to learn about how to assess the projects and to find the cost of the project using cost benefit evaluation techniques and to evaluate the risks involved in the project.The student should be made to understand the activity plan for a project and to estimate the overall duration of the project by analyzing the risks involved in it.The student should be made to learn how to monitor the progress of projects and to assess the risk of slippage so that project's requirements can be controlled. To identify the factors that influence people's behavior in a project environment and selection of appropriate people for the project, continual training and learning to improve group working to select appropriate leadership styles.

Prerequisite:

Software project management, Project planning, cost benefit.

Course outcomes:

On the successful completion of the course students will be able to

CO1:	Understand the fundamentals of Software Project Management, Software Project Versus Other Project, Requirement Specification, Information and Control in Organization. Understand the Introduction to step wise Project Planning, Select, Identify Scope and Objectives, Identify Project Infrastructure, Analyse Project Characteristics, Products and Activities. Understand the estimate Effort for each Activity , Identify Activity Risks , Allocate Resources , Review / Publicize Plan , Execute Plan and Lower Levels of Planning.	Understand /Analyse

CO2:	Understand the Project Evaluation: Introduction , Strategic Assessment, Technical Assessment , Cost Benefit Analysis , Cash Flow Forecasting , Cost Benefit Evaluation Techniques. Understand the Risk Evaluation , Selection of an Appropriate Project App roach, Choosing Technologies, Choice of Process Models , Structured Methods , Rap id Application Development , Waterfall Model, V-Process Model ,Spiral Model. Understand the Software Prototyping , Ways of Categorizing Prototypes, Tools , Incremental Delivery, Selection Process Model.	Understand /Analyse
CO3:	Understand the fundamentals of Software Effort Estimation : Introduction, Problem s with Over and Under Estimates, Basis for Software Estimating, Software Effort Estimation Technique. Understand the fundamental of Albrecht Function Point Analysis, Function Points, Object Points, Procedural Code Oriented Approach. Understand the various types of passes like Forward Pass , Backward Pass, Identifying the Critical Path , Activity Float ,Shortening Project Duration , Identifying Critical Activities, Precedence Networks.	Understand / Analyse
CO4:	Understand the introduction of Risk Management : Nature of Risk Managing Identification, Analysis, Reducing, Evaluating Z values, Resource Allocation, Nature of Resources. Understand the Requirements of Scheduling, Critical Paths, Counting the Cost, Resource Schedule, Cost Schedule, Scheduling Sequence, Monitoring and Control, Creating the Frame Work. Understand the Collecting the Data, Visualizing the Progress, Cost Monitoring, Prioritizing Monitoring, Change Control.	Understand / Analyse

CO5:	Understanding the various types of contracts, Managing Contracts, Stages in Contract Placement ,Terms of Contract, Contract Management, Acceptance, Managing People and Organizing Teams. Understand the Organizational Behavior Background, Selecting the Right Person for the Job, Instruction in the Best Methods, Motivation, Decision Making, Leadership, Organizational Structures, Software Quality, Importance, Practical Measures, Product.	Understand / Analyse

Mapping with programme outcomes:

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**S**	**S**	**S**		**M**	**M**	**S**		**M**			
CO2	**S**				**S**					**M**		**S**
CO3	**S**			**S**		**M**		**S**			**M**	
CO4	**S**		**M**				**S**		**S**		**S**	**S**
CO5	**S**	**S**						**S**		**S**		**M**

S- Strong; M-Medium; L-Low

Assessment pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	20	20	20	20
Understand	30	30	30	30
Apply	20	20	20	20
Analyse	30	30	30	30
Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Unit - I Introduction: **Software Project Management (CO1):**

1. Define: Software project management.
2. Describe how the resources allocated for the software project development.
3. What does it mean to execute a plan?
4. What happens during project planning?
5. How do you identify risks in software projects?

Unit - II Project Evaluation (CO2):

1. What is strategic assessment of project?
2. How do you calculate cost benefit analysis in project management?
3. Why do a cash flow forecast?
4. Describe the rapid application development.
5. List down the advantages and disadvantages of spiral model.

Unit – III Software Effort Estimation (CO3):

1. Explain the four basic steps in software project estimation.
2. What is Function Point estimation?
3. List out the types of COCOMO model.
4. Define activity planning.
5. What is total float in project management?

Unit – IV Risk Management(CO4):

1. How do you identify risks in software projects?.
2. What is resource allocation?
3. Explain critical paths.
4. Why is scheduling important in project management?
5. Describe z values in software project management.

Unit - V Managing Contracts(CO5):

1. What is organizational behaviour?
2. Define: software quality.
3. Explain Decision Making.
4. Briefly explain Contract Management.
5. List out the types of contract in software project management.

Syllabus:

Unit - I Introduction: Software Project Management - Software Project Versus Other Project – Requirement Specification – Information and Control in Organization – Introduction to step wise Project Planning – Select – Identify Scope and Objectives - Identify Project Infrastructure – Analyse Project Characteristics – Products and Activities – Estimate Effort for each Activity – Identify Activity Risks – Allocate Resources - Review / Publicize Plan – Execute Plan and Lower Levels of Planning.

Unit - II Project Evaluation : Introduction – Strategic Assessment – Technical Assessment – Cost Benefit Analysis – Cash Flow Forecasting – Cost Benefit Evaluation Techniques – Risk Evaluation – Selection of an Appropriate Project App roach – Choosing Technologies – Choice of Process Models – Structured Methods – Rap id Application Development – Waterfall Model – V-Process Model – Spiral Model – Software Prototyping – Ways of Categorizing Prototypes – Tools – Incremental Delivery – Selection Process Model.

Unit - III Software Effort Estimation : Introduction – Problem s with Over and Under Estimates – Basis for Software Estimating – Software Effort Estimation Technique – Albrecht Function Point Analysis – Function Points – Object Points – Procedural Code Oriented Approach – COCOMO – Activity Planning – Project Schedules - Projects and activities – Sequencing and Scheduling Activities – Network Planning Models – Formulating a Network Planning – Adding Time Dimension – Forward Pass – Backward Pas s – Identifying the Critical Path – Activity Float -Shortening Project Duration – Identifying Critical Activities – Precedence Networks.

Unit - IV Risk Management : Introduction – Nature of Risk Man aging Identification – Analysis – Reducing – Evaluating – Z values – Resource Allocation – Nature of Resources – Requirements – Scheduling – Critical Paths – Counting the Cost – Resource Schedule – Cost

Schedule – Scheduling Sequence – Monitoring and Control – Creating the Frame Work - Collecting the Data – Visualizing the Progress – Cost Monitoring – Prioritizing Monitoring – Change Control.

Unit - V Managing Contracts : Introduction – Types of Contract – Stages in Contract Placement – Terms of Contract – Contract Management – Acceptance – Managing People and Organizing Teams – Organizational Behavior Background – Selecting the Right Person for the Job – Instruction in the Best Methods – Motivation – Decision Making – Leadership – Organizational Structures – Software Quality – Importance – Practical Measures – Product.

References:

1. Bob Hughes and Mike Cotterell, "Software Project Management ,McGraw Hill, Second Edition.
2. Walker Royce, "Software Project Management , Addition Wesley.
3. DerrelInce, H. Sharp and M. Woodman, "Introduction to Software Project Management and Quality Assurance , Tata McGraw Hill, 1995.

E-Resources

1. https://www.springer.com/in/book/9780792398141
2. https://www.tutorialspoint.com/fuzzy_logic/fuzziness_in_neural_networks.htm
3. http://www.scholarpedia.org/article/Fuzzy_neural_network

Course content and lecture schedule:

Module No.	Topic	No of Lectures
1	**Software Project Management**	
1.1	Introduction of Software Project Management- Project Planning- Identify Scope and Objectives	3
1.2	Identify Activity Risks-Allocate Resources-Review / Publicize Plan- Execute Plan.	2
2	**Project Evaluation**	
2.1	Strategic Assessment- Technical Assessment	3
2.2	Cost Benefit Analysis- Cash Flow Forecasting	1
2.3	Cost Benefit Evaluation Techniques - Risk Evaluation	2

2.4	Choice of Process Models-Structured Methods	3
2.5	Rapid Application Development- Waterfall Model-Process Model-Spiral Model	2
2.6	Software Prototyping-Ways of Categorizing Prototypes-Tools- Selection Process Model	3
3	**Software Effort Estimation**	
3.1	Software Effort Estimation Technique- Albrecht Function	2
3.2	COCOMO-Activity Planning - Project Schedules - Projects and activities	2
3.3	Sequencing and Scheduling Activities - Network Planning Models	3
3.4	Formulating a Network Planning - Adding Time Dimension - Forward Pass	2
3.5	Backward Pass - Identifying the Critical Path - Activity Float - Precedence Networks.	2
4	**Risk Management**	
4.1	Nature of Risk Managing Identification – Analysis - Reducing – Evaluating - Z values - Resource Allocation	3
4.2	Nature of Resources-Requirements – Scheduling - Critical Paths - Counting the Cost - Scheduling	2
4.3	Monitoring and Control - Creating the Frame Work - Collecting the Data - Visualizing the Progress	3
4.4	Monitoring cost – prioritizing - Change Control.	1
5	**Managing Contracts**	
5.1	Types of Contract - Stages in Contract Placement - Terms of Contract - Acceptance	2
5.2	Managing People and Organizing Teams - Organizational Behavior Background	2
5.3	Selecting the Right Person for the Job - Instruction in	2

	the Best Methods	
5.4	Motivation - Decision making - Leadership - Organizational Structures	2
5.5	Software Quality - Importance - Practical Measures	1
	Total	**48**

Course Prepared by: Dr. D. Napoleon

Course Verified by: Dr.E.Chandra

CLOUD COMPUTING

Subject Code: 19CS3C4 **No. of Credits: L P T**

4 0 4

Preamble

The aim of this course is to introduce the student to gain knowledge on various services of cloud computing. Cloud computing covers a range of distributed computing, hosting and access solutions including service based computing. This course provides a comprehensive study on cloud concepts, cloud computing technology, virtualization, migration and data security into cloud. It provides a capability across the various cloud service models including Infrastructure as a Service (IaaS) and Software as a Service (SaaS). On successful completion of the course the student should have understood the different concepts of cloud computing and its services, to store and retrieve the data from cloud and can provide the security to the data in cloud.

Prerequisite

This course requires knowledge in computer networking, web technology and distributed computing.

Course Outcomes

Upon completion of the course, the student will be able to

CO 1: Articulate the main concepts, key technologies of cloud computing in terms of strengths, limitations and applications. **Remember / Understand**

CO 2: Categorize the architecture and infrastructure of cloud computing such as IaaS and SaaS. **Understand / Analyse**

CO 3: Explain the concept of virtual machines and virtualization. **Understand**

CO 4: Apply suitable storage algorithms in cloud computing. **Apply**

CO 5: Be expose in broad approaches of migrating into a cloud and mobile cloud computing. **Analyse**

CO 6: Describe about the data security concepts in cloud computing. **Understand**

Mapping with Programme Outcomes

COS	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	M	S	M	L						S		S
CO2	M	M	M	M						S		M
CO3	S	S	M	M								M
CO4	S	S	S	S						M		S

CO5	S	S	M	S								S
CO6	S	S	L	S						M		S

S- Strong; M-Medium; L-Low

Assessment Pattern

Bloom's Category	**Continuous Assessment Tests**			**Terminal Examination**
	1	**2**	**3**	
Remember	**10**	**10**	**10**	**10**
Understand	**40**	**40**	**40**	**40**
Apply	**20**	**20**	**20**	**20**
Analyse	**30**	**30**	**30**	**30**
Evaluate	**0**	**0**	**0**	**0**
Create	**0**	**0**	**0**	**0**

Course Level Assessment Questions

Articulate the main concepts, key technologies of cloud computing in terms of strengths, limitations and applications (CO1):

1. Define Cloud Computing
2. Explain about the applications of cloud computing
3. Write a short note on intranets and the cloud
4. List out the various cloud computing services
5. What are the security concerns in cloud computing?

Categorize the architecture and infrastructure of cloud computing such as IaaS and SaaS (CO2):

1. Write a short note on cloud computing technologies.
2. List out the types of clients in cloud computing technologies.
3. Explain the standards in cloud computing technology.
4. Describe the concepts of Software as a Service.
5. Explain the steps involved in developing cloud applications.

Explain the concept of virtual machines and virtualization (CO3):

1. Explain the history of virtualization in cloud computing.
2. Discuss about the leveraging blade servers.
3. Explain about the server and desktop virtualization in detail
4. Write a short note on virtual networks.
5. Describe the concept of data storage virtualization.

Apply suitable storage algorithms in cloud computing (CO4):

1. Discuss about the evolution of network storage.
2. Write short note on cloud based data storage.
3. What are the advantages and disadvantages of cloud based data storage?
4. Explain the concept of cloud based backup systems.
5. Describe in detail about the cloud based block storage.

Be expose in broad approaches of migrating into a cloud and mobile cloud computing (CO5):

1. What are the approaches of migrating into cloud?
2. Describe the seven step models of migrating into a cloud.
3. Write a short note on mobile cloud computing.
4. Explain the evolution of mobile computing.
5. Discuss the concept of mobile cloud ecosystem.

Syllabus

Unit - I

Introduction: Cloud Computing Basics: Cloud Computing Overview - Applications of cloud computing - Intranets and the cloud – First movers in the cloud - Benefits - limitations of cloud computing – Security Concerns – Cloud Computing Services – Salesforce.com.

Unit - II

Cloud Computing Technology: Hardware and Infrastructure – Clients – Security – Network – Services - Cloud Storage – Standards – Cloud Computing at work: Software as a Service – Software Plus Services – Developing Applications.

Unit - III

Virtual Machines and Virtualization: Introduction - Understanding Virtualization - History of Virtualization – Leveraging Blade Servers – Server Virtualization – Desktop Virtualization – Virtual Networks – Data Storage Virtualization. Data Storage in Cloud: Evolution of Network Storage – Cloud based data Storage – Advantages and disadvantages of Cloud based data storage- Cloud based Backup systems - File Systems – Cloud based Block Storage.

Unit – IV

Migrating into a Cloud: Introduction – Broad approaches of Migrating into cloud – The Seven Step Models of Migrating into a Cloud. Mobile Cloud Computing: Evolution of Mobile Computing – Mobile Cloud EcoSystem – Mobile Players.

Unit - V

Data security in cloud: Introduction – Current state of data security – Homo sapiens and Digital Information – Cloud Computing and Data security Risk – Cloud Computing and Identity – The Cloud, Digital Identity and Data Security- Content Level Security- Pros and Cons.

Reference books

1. Anthony T. Velte, Toby J. Velte, Robert Elsenpeter, " Cloud Computing: A Practical Approach", McGraw Hill.
2. Kris Jamsa, " Cloud Computing" Jones and Barlett Student Edition 2014.
3. RajkumarByya, James Broberg, AndrzejGoscinski, " Cloud Computing Prnciples and Paradigms", Wiley & sons

Course Contents and Lecture Schedule

Module No.	**Topic**	**No. of Lectures**
1	**UNIT-I**	
1.1	Introduction to cloud computing basics	1
1.2	Applications of cloud computing	2
1.3	Intranets and the cloud	2
1.4	Security concerns	2
1.5	Cloud computing services	2
2	**UNIT-II**	
2.1	Cloud Computing Technology	2
2.2	Hardware and Infrastructure	3
2.3	Cloud Computing at work	2
2.4	Developing Applications	2
3	**UNIT-III**	
3.1	Virtual Machines and Virtualization	3
3.2	Data Storage in Cloud	3
3.3	Cloud based Backup systems	3
4	**UNIT-IV**	
4.1	Migrating into a Cloud	3
4.2	The Seven Step Models of Migrating into a Cloud	2
4.3	Mobile Cloud Computing	2

4.4	Mobile Cloud EcoSystem	2
5	**UNIT-V**	
5.1	Data security in cloud	3
5.2	Cloud Computing and Data security Risk	3
5.3	The Cloud, Digital Identity and Data Security	3
	Total	45

Course Prepared by: Dr. D. Ramyachitra

Course Verified by: Dr.E.Chandra

BIG DATA ANALYTICS

Subject Code: **18CS3C5**	No. of Credits	L	P	T
		2	2	4

Preamble

Big data analytics is the process of analyzing large data sets which contains a variety of data types to discover hidden patterns, unknown correlations, market trends, customer preferences and other useful information. The primary objective of this course is to provide in depth knowledge about the basic concepts ofbig data. It also covers big data technologies and databases like HDFS, Cassandra, HiveQL, Pig, Neo4j andMongoDB. This course assists the students to learn the foundations of big data, emerging big data technologies and visualization techniques.

Prerequisite:

Fundamentals of Data Mining and Database Management.

Course outcomes:

On the successful completion of the course students will be able to

CO1:	Understand about basics of Big data and its technologies. Describe the applications of bigdata in various domains like Marketing, Credit Risk Management, Fraudulent analysis and HealthCare	Understand
CO2:	Understand the foundations of Hadoop, Hadoop Distributed File System and Map Reduce. Analyse How Hadoop handles data and working of Map Reduce.	Understand/Analyse
CO3:	Understand the need and fundamentals of Cassandra. Analyse Cassandra data model. Design and Development of simple Cassandra applications.	Understand/Analyse/Apply
CO4:	Understand the basic commands in HiveQL. Design and develop the simple queries using HiveQL.	Understand/Analyse/Apply
CO5:	Understand the introduction of Pig, Pig Grunt and Pig Latin. Develop and Analyse coding in Pig.	Understand/Analyse/Apply
CO6:	Understand the essentials of MongoDB. Able to develop and analyse databases using MongoDB.	Understand/Analyse/Apply
CO7:	Understand the basic concepts and need for Graph databases. Design and create thedatabases and retrieve the records using Neo4j.	Understand/Analyse/Apply

CO8:	Understand the need for data visualization. Create simple visual analytics using RapidMiner.	Understand/Analyse/Apply

Mapping with programme outcomes:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**S**	**M**								**L**		
CO2	**S**	**M**										**M**
CO3	**S**	**L**	**S**	**M**								**M**
CO4	**S**	**M**	**S**	**M**								**S**
CO5	**S**	**L**	**S**	**M**								**S**
CO6	**S**	**M**	**S**	**M**						**S**		**S**
CO7			**S**	**M**								**S**
CO8			**S**	**M**			**L**					**S**

S- Strong; M-Medium; L-Low

Assessment pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	20	20	20	20
Understand	30	30	30	30
Apply	20	20	20	20
Analyse	30	30	30	30
Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Basicsin Big data (CO1):

1. What are the different types of data?
2. Define: Big Data.
3. Why Web Analytics is necessary?

4. Explain the applications of Big Data in Marketing.
5. Brief the Big Data technologies.

Hadoop(CO2):

6. Brief about the components of Hadoop.
7. What is Hadoop Distributed File System?
8. Differentiate: Mappers and Reducers.
9. How to run a Map Reduce program in Big data?
10. How data are handled in Hadoop?

Cassandra (CO3):

6. List out the needs of Cassandra.
7. Explain about Cassandra data model.
8. List out the drawbacks of relational database.
9. What is keyspace in Cassandra?
10. Define: Column family in Cassandra.

HiveQL(CO4):

6. Differentiate:External and Internal tables in Hive.
7. Briefly discuss Bucketing in Hive.
8. Write Hive commands to upload a data file called Person001.csv into a table named ascensus.person
9. How to enabletransactions in Hive? Discuss its configuration.
10. Define:Sqoop.

Pig (CO5):

6. What is Pig Grunt?
7. Define: Pig Latin.
8. Write a command to load data into Pig from the HDFS file system.
9. Briefly describe Pig data model.
10. List out the features of Pig.

MongoDB (CO6):

1. Briefly elaborate NoSQL databases.
2. Differentiate:NoSQL and relational databases.
3. Briefly describe MongoDB data model.

4. How replicas are handled in MongoDB?
5. List out the advantages of MongoDB.

Neo4j (CO7):

1. **Differentiate: Graph database and Relational database.**
2. **Define: Cypher Query Language.**
3. **How will you create a database in Neo4j?**
4. **How to track relations among attributes in Neo4j?**
5. **Explain how to model data in Neo4j.**

Data Visualization (CO8):

1. **List out the advantages of Data visualization.**
2. **List out some of the open source data visualization tools.**
3. **Describe the importance of Visualization Analytics.**
4. **What is RapidMiner used for?**
5. **How visualization is done in RapidMiner?**

Syllabus:

Unit I: Big data Introduction: What is big data – why big data – convergence of key trends - unstructured data – industry examples of big data – Web analytics - big data and marketing – fraud andbig data - risk and big data – credit risk management – big data and algorithmic trading - big data andhealthcare – big data in medicine – advertising and big data – big data technologies - cloud and big data– mobile business intelligence – crowd sourcing analytics.

Unit II: Hadoop: History of Hadoop - The Hadoop Distributed File System – componenets of Hadoop - Analyzing the Data with Hadoop - Design of HDFS - How MapReduce Works – Anatomy of a MapReduce – Map Reduce types and formats – Map Reduce features.

Unit III: Cassandra and Hive: Introduction to Cassandra – Drawbacks of Relational Database -Cassandra data model – Cassandra examples. Hive – data types and file formats – HiveQLdatadefinition – HiveQL data manipulation – HiveQL queries.

Unit IV: Pig and MongoDB: Pig Introduction – Pig Grunt – Pig data model – Pig Latin. IntroductiontoNoSQL – document based database - MongoDB Introduction - Data Model - Working with data -Replication and Sharding – Development.

Unit V: Graph Databases: Graph databases – Introduction - Neo4J - Key concept and characteristics -Modeling data for neo4j - Importing data into neo4j - visualizations - neo4j - Cypher Query Language –data visualization - creating visual analytics with RapidMiner.

Reference books:

- Tom White, "Hadoop: The Definitive Guide", Fourth Edition, O′Reilly Publishers, June 2012.
- The Definitive Guide to Mongodb, Second Edition, O'Reilly Media publishers, February 2013.
- Rik Van Bruggen, "Learning Neo4j", Second Edition, PacktPubishers, August 2014.
- Dirk deRoos, Paul Zikopoulos, Bruce Brown, Roman B. Melnyk,RafaelCoss, "Hadoop For Dummies", John Wiley and sons publishers, 2014.
- GauravVaish, "Getting Started with NoSQL" , First Edition, PacktPubishers, 2013.
- Pramod J. Sadalage, Martin Fowler, "NoSQL Distilled: A Brief Guide to the EmergingWorld of Polyglot Persistence" Addison Wesley publishers, 2013.
- Andreas Francois Vermeulen ,Ankurgupta, Cindy Gross, David Kjerrumgaard and Scott Shaw, Practical Hive: A Guide to Hadoop's Data Warehouse System, Apress Media publishers, 2016.
- Eric Lubow and Russell Baradberry, Practical Cassandra: A Developer's Approach, Addison Wesley publishers, 2014.
- RapidMiner Studio Manual.

E-Resources

4. http://statweb.stanford.edu/~tibs/ElemStatLearn/
5. https://www.edureka.co/blog/big-data-tutorial
6. https://developer.yahoo.com/hadoop/tutorial/
7. https://intellipaat.com/ Big Data

List of Concepts to be covered in Practical:

1. Hadoop Setup and Installation.
2. To implement the following file management tasks in Hadoop System (HDFS): Adding files and directories, Retrieving files, Deleting files.
3. To implement the following HDFS basic Command-line file operations:
   a) Create a directory in HDFS
   b) List the contents of a directory
   c) Upload and download a file in HDFS

d) Find the contents of a file
e) Copy a file from source to destination
f) Move file from source to destination
g) Remove a file or directory in HDFS
h) Display last few lines of a file

4. To run a basic Word Count MapReduce program to understand MapReduce Paradigm: To count words in a given file, to view the output file and to calculate execution time.
5. Install and Run Hive and perform table operations.
6. To create digital library dataset and perform read, update and delete operations in Hive.
7. To create an employee dataset and perform read, update and delete operations in MongoDB.
8. To find average, max and min marks for each year in student data set in MongoDB
9. To import an inventory dataset and perform MapReduce in MongoDB.
10. To create a hospital dataset (doctor and patient details) and perform read, update and delete operations in Neo4j.
11. To import a retail dataset and perform read, update and delete operations in Neo4j.
12. To import customer dataset and products dataset and find the relationship in Neo4j.
13. To construct a graph for social media dataset in Neo4j.
14. Installation of Cassandra and perform key space and table operation.
15. To create a ticket booking agency dataset and perform read, update and delete operations in Cassandra.

Course content and lecture schedule:

Module no	Topic	No of Lectures
1	**Big data Introduction**	
1.1	What is big data – why big data – convergence of key trends	1
1.2	Unstructured data – industry examples of big data – Web analytics - big data and marketing–fraud and big data	1
1.3	Risk and big data –credit risk management – big data and algorithmic - big data and healthcare – big data in medicine – advertising and big data –	1
1.4	Big data technologies - Cloud and big data – mobile business intelligence – crowd sourcing analytics.	1
2	**Hadoop**	
2.1	History of Hadoop	1

2.2	The Hadoop Distributed File System –componenets of hadoop	1
2.3	Analyzing the Data with Hadoop	1
2.4	Design of HDFS	1
2.5	How MapReduce Works – Anatomy of a Map Reduce - Map Reduce types and formats – Map Reduce features.	1
3	**Cassandra and Hive**	
3.1	Introduction to Cassandra – Drawbacks of Relational Database - Cassandra data model- Cassandra examples	2
3.2	Hive – data types and file formats – HiveQL data definition - HiveQL data manipulation – HiveQL queries	2
4	**Pig and MongoDB**	
4.1	Pig Introduction –Pig Grunt – pig data model – Pig Latin.	1
4.2	Introduction to NoSQL –document based database	1
4.3	MongoDB - Introduction - Data Model - Working with data	1
4.4	Replication &Sharding and Development	2
5	**Graph Databases**	
5.1	Introduction - Neo4J Key concept and characteristics- Modeling data for neo4j- Importing data into neo4j	2
5.2	Cypher Query Language – data visualization	2
5.3	Creating visual analytics with RapidMiner.	2
	Total	**24**

Course Prepared By: Dr. S. Vijayarani

Course Verified by: Dr.E.Chandra

Elective Papers

Sem.	Suggested Code	Title of the Paper	No. of Credits
III	19CS3E01	Machine Learning Techniques	4
	19CS3E02	Neural Networks and Fuzzy Systems	4
	19CS3E03	E-Commerce	4
	19CS3E04	Distributed Systems	4
	19CS3E05	Open Source Technologies	4

MACHINE LEARNING TECHNIQUES

Subject Code: 19CS3E01	**No. of Credits:**	**L**	**P**	**T**
		4	**0**	**4**

Preamble

This course presents the foundations of machine learning techniques and makes the students to understand Machine Learning Models such as linear models, distance based models, tree and rule based model and reinforcement learning. At the end of this course, learner will be able to suggest the machine learning strategy applicable to the given problem.

Prerequisite:

Degree level knowledge in the field of computer and programming skills.

Course outcomes:

On the successful completion of the course students will be able to

- Distinguish between, supervised, unsupervised and reinforcement learning
- understand existing machine learning algorithms and their classification efficiency
- Discuss the decision tree algorithm and identify and overcome the problem of over fitting
- Analyse various machine learning models
- Apply the apt machine learning strategy for any given problem

CO1	Understand objectives of machine learning Define Components of learning Difference among supervised, unsupervised and reinforcement learning Understand training and testing Define bias and variance	Understand
CO2	Describe Linear Classification Concept of univariate and multivariate linear regression Multilayer neural Networks Understand SVM and Soft SVM	Understand/Analyse/Apply
CO3	Understand Nearest neighbour models, K means clustering, Hierarchical clustering.	Understand /Analyse

	Understand K- D trees Learning Ensample learning method Analysing Bagging, random forest and Meta learning	
C04	Understand Decision tree, Ranking and probability, analysing estimation trees and Regression trees Learning ordered rule list Applying Association rule mining to the given problem	Understand/ Analyse /Apply
C05	Understand reinforcement learning, its application in game playing and applications in robot control.	Understand/ Analyse /Apply

Mapping with programme outcomes:

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**S**	**M**										
CO2	**S**	**M**										
CO3	**S**	**M**										
CO4	**S**	**M**	**L**									
CO5	**S**	**M**	**L**									

S- Strong; M-Medium; L-Low

Assessment pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	30	20	20	20
Understand	40	40	40	40
Apply	30	30	30	30
Analyse	0	10	10	10
Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Foundations of learning (CO1):

1. Describe the components of Machine Learning.
2. Describe Probabilistic model.
3. Differentiate Supervised learning from unsupervised learning
4. Describe steps involved in training and in testing

Linear Models (CO2):

1. What is the difference between univariate linear regression and multivariate linear regression?
2. What are the steps in Back propagation algorithm? Why a Multilayer neural network is required?
3. What is soft margin SVM?
4. Define Over fitting.

Distance-based models(CO3):

1. Explain k means clustering with example
2. Define Bagging.

Tree and rule models(CO4):

1. What are the issues in Decision tree learning? How they are overcome?
2. What is regression tree?

Reinforcement learning(CO5):

1. Write in detail about reinforcement learning.
2. Illustrate the reinforcement learning cycle.
3. Identify how reinforcement learning maps states to action.

Syllabus:

Unit – I: FOUNDATIONS OF LEARNING : Components of learning – learning models – geometric models – probabilistic models – logic models – grouping and grading – learning versus design – types of learning – supervised – unsupervised – reinforcement – theory of learning – feasibility of learning – error and noise – training versus testing – theory of generalization – generalization bound –bias and variance – learning curve.

Unit – II: LINEAR MODELS : Linear classification – univariate linear regression – multivariate linear regression – regularized regression – Logistic regression – perceptrons – multilayer neural networks – learning neural networks structures – support vector machines – soft margin SVM – generalization and over fitting – regularization – validation.

Unit – III: DISTANCE-BASED MODELS : Nearest neighbor models – K-means – clustering around medoids – silhouettes – hierarchical clustering – k- d trees – locality sensitive hashing – non - parametric regression – ensemble learning – bagging and random forests – boosting – meta learning.

Unit –IV: TREE AND RULE MODELS : Decision trees – learning decision trees – ranking and probability estimation trees – Regression trees – clustering trees – learning ordered rule lists – learning unordered rule lists – descriptive rule learning – association rule mining – first -order rule learning.

Unit – V: REINFORCEMENT LEARNING : Passive reinforcement learning – direct utility estimation – adaptive dynamic programming – temporal - difference learning – active reinforcement learning – exploration – learning an action utility function – Generalization in reinforcement learning – policy search – applications in game playing – applications in robot control

Reference books:

1. Y. S. Abu - Mostafa, M. Magdon-Ismail, and H.-T. Lin, "Learning from Data", AMLBook Publishers, 2012.
2. P. Flach, "Machine Learning: The art and science of algorithms that make sense of data", Cambridge University Press, 2012.
3. K. P. Murphy, "Machine Learning: A probabilistic perspective", MIT Press, 2012.
4. C. M. Bishop, "Pattern Recognition and Machine Learning", Springer, 2007.
5. D. Barber, "Bayesian Reasoning and Machine Learning", Cambridge University Press,2012

E-Resources

1. https://www.geeksforgeeks.org/machine-learning/
2. https://www.tutorialspoint.com/machine_learning_with_python/

Course content and lecture schedule:

Module no	Topic	No of Lectures
1	**FOUNDATIONS OF LEARNING**	
1.1	Components of learning	1
1.2	Learning models, geometric models, probabilistic models and logic models	2
1.3	Grouping and grading, learning versus design	1
1.4	Types of learning : supervised, unsupervised, reinforcement	1
1.5	Theory of learning: feasibility of learning, error and noise	1

1.6	Training versus testing, theory of generalization, generalization bound	1
1.7	Bias and variance, learning curve	1
2	**LINEAR MODELS**	
2.1	Linear classification – univariate linear regression and multivariate linear regression	2
2.2	Regularized regression, Logistic regression, perceptrons, multilayer neural networks	3
2.3	Learning neural networks structures	3
2.4	Support vector machines, soft margin SVM , generalization and over fitting	3
2.5	Regularization, validation.	1
3	**DISTANCE-BASED MODELS**	
3.1	Nearest neighbor models, K-means	2
3.2	Clustering around medoids, silhouettes, hierarchical clustering	2
3.3	K- d trees, locality sensitive hashing, non - parametric regression	2
3.4	Ensemble learning	2
3.5	Bagging and random forests	1
3.6	Boosting, meta learning	1
4	**TREE AND RULE MODELS**	
4.1	Decision trees, learning decision trees	2
4.2	Ranking and probability estimation trees	2
4.3	Regression trees, clustering trees	2
4.4	Learning ordered rule lists, learning unordered rule lists	2
4.5	Descriptive rule learning	1
4.6	Association rule mining	1
4.7	First -order rule learning systems	1
5	**REINFORCEMENT LEARNING**	
5.1	Passive reinforcement learning and Direct utility estimation	1

5.2	Adaptive dynamic programming, temporal - difference learning	2
5.3	Active reinforcement learning – exploration	2
5.4	Learning an action utility function	1
5.5	Generalization in reinforcement learning, Policy search	1
5.6	Applications in game playing – applications in robot control	2
	Total	**50**

Course Prepared by: Dr. K. Geetha

Course Verified by: Dr.E.Chandra

NEURAL NETWORKS AND FUZZY SYSTEMS

Subject Code: 19CS3E02 No. of Credits L P T

0 0 4

Preamble

Neural networks process information in a similar way the human brain does. The network is composed of a large number of highly interconnected processing elements (neurons) working in parallel to solve a specific problem. Neural networks learn by example. They cannot be programmed to perform a specific task. Fuzzy logic is a form of many-valued logic in which the truth values of variables may be any real number between 0 and 1 inclusive. A fuzzy control system is a control system based on fuzzy logic. The course is designed to introduce about the fundamental of neural networks, Back Propagation Networks, fuzzy systems that includes Fuzzy Set Theory, Fuzzy logic and defuzzification. The course aims to create a neural networks and fuzzy systems to match any set of input data.

Prerequisite:

Data Mining, Artificial Intelligence, Probability Theory.

Course outcomes:

On the successful completion of the course students will be able to

CO1:	Understand the fundamentals of Neural Networks, Human Brain – Model of an Artificial Neuron, Characteristics of Neural Networks	Understand
CO2:	Understand various taxonomies of Neural Network Architectures, fundamentals of History of Neural Network Researchand Application Domains in neural networks.	Understand
CO3:	Understand the basics of Back Propagation Networks, its Architecture and Applications.Tuning Parameters of the Back Propagation, Neural Network Selection of Various Parameters in BPN.	Understand/Analyse/Apply
CO4:	Understand the basics of Adaptive Resonance Theory, ART1 and AR T2 and its Applications.	Understand/Analyse
CO5:	Understand the basics of Fuzzy Set Theory, Crisp Sets, Fuzzy Sets,Crisp Relations and Fuzzy Relations.	Understand/Analyse
CO6:	Understand the basics of Fuzzy Systems, Crisp Logic and Predicate Logic	Understand/Analyse
CO7:	Understand the fundamentals of Fuzzy Logic, Fuzzy Rule Based System and Defuzzification Methods.	Understand/Analyse/Apply

Mapping with programme outcomes:

Cos	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	**S**	**M**								**L**		
CO2	**S**	**M**										**M**
CO3	**S**	**L**	**S**	**M**								**M**
CO4	**S**	**M**	**S**	**M**								**S**
CO5	**S**	**L**	**S**	**M**								**S**
CO6	**S**	**M**	**S**	**M**						**S**		**S**
CO7			**S**	**M**								**S**

S- Strong; M-Medium; L-Low

Assessment pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	20	20	20	20
Understand	30	30	30	30
Apply	20	20	20	20
Analyse	30	30	30	30
Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Fundamentals of Neural Networks (CO1):

1. Define: Neural Networks
2. Describe how human brain is modelled as Artificial Neuron.
3. List out the characteristics of Neural Networks.
4. Define:Artificial neural networks.
5. Describe the types of neural networks.

Architecture of Neural Network (CO2):

1. Brief about the architecture of neural network.
2. What is the history of neural network?
3. List out the significant research areas in neural network.
4. What are the application domains of neural network?

5. Explain the components of neural networks.

Back Propagation Networks (CO3):

1. Define Back Propagation Networks.
2. Explain the architecture of Back Propagation Network.
3. List out the applications of Back Propagation Networks.
4. What are Tuning Parameters of the Back Propagation?
5. What are parameters of Back Propagation Networks?

Adaptive Resonance (CO4):

1. Define Adaptive Resonance.
2. What is Adaptive Resonance theory?
3. Explain Adaptive Resonance theory ART1.
4. Explain how input layer differs in ART1 and ART2.
5. List out the applications of Adaptive Resonance.

Fuzzy Set Theory (CO5):

1. What is Fuzzy set theory?
2. Define:Crisp Sets.
3. What is a fuzzy set?
4. Briefly describe Crisp Relations in fuzzy set theory.
5. List out the features of Fuzzy Relations.

Fuzzy Systems (CO6):

1. Briefly elaborate Fuzzy Systems.
2. What is Crisp Logic?
3. Describe Predicate logic in fuzzy systems.
4. Explainhow fuzzy systems are narrated?
5. List out the advantages of fuzzy systems.

Fuzzy Logic (CO7)

1. Why do we use Fuzzy Logic?
2. What do you mean by Fuzzy rules in fuzzy system?
3. List out the applications of fuzzy logic.
4. What is fuzzy inference?
5. Define:Defuzzification.

Syllabus:

Unit – I: Fundamentals of Neural Networks : Basic Concepts of Neural Networks – Human Brain – Model of an Artificial Neuron – Neural Network Architectures – Characteristics of Neural Networks – Learning Methods – Taxonomy of Neural Network Architectures – History of Neural Network Research – Easy Neural Network Architectures – Some Application Domains.

Unit – II: Back Propagation Networks : Architecture of a Back Propagation Network – Back Propagation Learning – Illustration – Applications – Effects of Tuning Parameters of the Back Propagation Neural Network – Selection of Various Parameters in BPN – Variations of Standard Back Propagation Algorithm.

Unit – III: Adaptive Resonance Theory: Introduction – ART1 – ART2 – Applications.

Unit – IV: Fuzzy Set Theory: Fuzzy versus Crisp – Crisp Sets – Fuzzy Sets – Crisp Relations – Fuzzy Relations.

Unit – V: Fuzzy Systems: Crisp Logic – Predicate Logic – Fuzzy Logic – Fuzzy Rule Based System – Defuzzification Methods.

Reference Books:

- Rajasekaran, G. A. VijayalakshmiPai, "Neural Networks, Fuzzy Logic and Genetic Algorithms Synthesis and Applications, Prentice Hall of India, 2003.
- James A. Freeman, David M. Skapura, "Neural Networks – Algorithms, Applications and Programming Techniques, Pearson Education.
- Fredric M. Ham, Ivica Kostunica, "Principles of Neuro Computing for Science of Engineering , Tata McGraw Hill.
- Simon Haykin, "Neural Networks – A Comprehensive Foundation , Prentice Hall of India.

E-Resources

1. https://www.springer.com/in/book/9780792398141
2. https://www.tutorialspoint.com/fuzzy_logic/fuzziness_in_neural_networks.htm
3. http://www.scholarpedia.org/article/Fuzzy_neural_network

Course content and lecture schedule:

Module no	Topic	No of Lectures
1	**Fundamentals of Neural Networks**	
1.1	Basic Concepts of Neural Networks – Human Brain – Model of an Artificial Neuron.	3
1.2	Neural Network Architectures – Characteristics of Neural Networks	2
1.3	Learning Methods – Taxonomy of Neural Network Architectures	2
1.4	History of Neural Network Research – Easy Neural Network Architectures – Some Application Domains	4
2	**Back Propagation Networks**	
2.1	Architecture of a Back Propagation Network –	2
2.2	Back Propagation Learning - Illustration – Applications	3
2.3	Effects of Tuning Parameters of the Back Propagation Neural Network	2
2.4	Selection of Various Parameters in BPN	2
2.5	Variations of Standard Back Propagation Algorithm.	2
3	**Adaptive Resonance Theory**:	
3.1	Adaptive Resonance Theory – Introduction	2
3.2	ART1 and ART2	4
3.3	Applications	2
4	**Fuzzy Set Theory**	
4.1	Introduction	1
4.2	Fuzzy versus Crisp	2
4.3	Crisp Sets	3
4.4	Fuzzy Sets	3
4.5	Crisp Relations – Fuzzy Relations.	2
5	**Fuzzy Systems**	
5.1	Introduction	1
5.2	Crisp Logic	1

5.3	Predicate Logic	1
5.4	Fuzz y Logic	1
5.5	Fuzzy Rule Based System	1
5.6	Defuzzification Methods	1
	Total	**47**

Course Prepared By: Dr. S. Vijayarani

Course Verified by: Dr.E.Chandra

E-COMMERCE

Subject Code: 19CS3E03 **No. of Credits** **L P T**

4 0 4

Preamble

The aim of this course is to bring the knowledge on e-commerce, Network, Web Services and Security concepts for the post graduate students. The course covers Introduction to E-Commerce, Benefits, Impacts, Business model,Architectural Frame Work. This paper focuses on Network Infrastructure, LAN, WAN, Internet, Information Distribution and Messaging and Web Service Implementation. This paper enables the student to be familiar with network infrastructure, Information Publishing Technology, Search Engines and Directory Services. At the end of this course, the students will be able to understand and effectively explain the principles in E-Commerce.

Prerequisite

Knowledge in E-Commerce, Basic Networks and Security.

Course Outcomes

On the successful completion of the course, students will able to

CO1	Acquire knowledge to Introduction of E-Commerce	**Understand/Remember**
CO2	Explain LAN, WAN, FTP and WWW	**Understand/Apply**
CO3	Learn Web Browsers, Multimedia Contents, and Security	**Understand /Analyse**
CO4	Learn about Electronic Payment Systems	**Understand/Analyse**
CO5	Explain Search Engines and Directory Services	**Understand/Apply**

Mapping with Programme Outcomes

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	S	M	M	S								
CO2	M	S	M	M								
CO3	M	L	L	M								
CO4	M	L	M	S								
CO5	S	M	L	M								

S- Strong; M-Medium; L-Low

Assessment Pattern

Bloom's Category	**Continuous Assessment Tests**			**Terminal Examination**
	1	**2**	**3**	
Remember	**20**	**20**	**20**	**20**
Understand	**30**	**30**	**30**	**30**
Apply	**20**	**20**	**20**	**20**
Analyse	**30**	**30**	**30**	**30**
Evaluate	**0**	**0**	**0**	**0**
Create	**0**	**0**	**0**	**0**

Course Level Assessment Questions

Acquire knowledge to Introduction of E-Commerce (CO1):

1. Explain the Architectural Frame Work in e-commerce.
2. Write a brief note on E-commerce benefits?
3. Explain in detail about Business Model.
4 Write a short note on Application of E-Commerce
5. What is the purpose of a database system?

Explain LAN, WAN, FTP and WWW (CO2):

1. Explain in detail about LAN and WAN.
2. Write a short note on Domain Name System.
3. Define WWW.
4. Explain in detail about Electronic Mail
5. Describe about the Internet Industry structure in detail.

Learn Web Browsers, Multimedia Contents, and Security (CO3):

1. Define VRML.
2. Describe in detail about Firewalls.
3. Define HTML.
4. What are the Other Multimedia Objects?
5. Explain in detail about Site Security

Learn about Electronic Payment Systems (CO4):

1. What are the differences between Pre-paid and Post-paid Electronic Payment System?
2. Describe about the Requirement Metrics of a Payment System.
3. Define Online Payment System
4. What is an Electronic Payment Systems?
5. Explain in detail about Pre-paid Electronic Payment System

Explain Search Engines and Directory Services (CO5):

1. What is the need for Agents in Electronic Commerce?
2. Explain in detail about the Search Engines
3. What are the various types of Agents?
4. Write a short note on Agent Technologies.
5. Explain in detail about Internet Adverting.

Syllabus

Unit – I

Introduction to E-Commerce: Benefits-Impacts-Classification and Application of E-Commerce-Business Model-Architectural Frame Work

Unit – II

Network Infrastructure: Local Area Network-Ethernet-Wide Area Network-Internet-TCP/IP Reference Model-Domain Name System-Internet Industry structure-Information Distribution and Messaging: FTP Application-Electronic Mail-World Wide Web Server-HTTP-Web Server Implementations

Unit – III

Information Publishing Technology: Information publishing-Web Browsers-HTML-CGI Multimedia Content - Other Multimedia Objects-VRML- Securing the Business on Internet-Why Information on Internet is vulnerable?-Security Policy-Procedures and Practices-Site Security Protecting the Network-Firewalls-Securing the Web Service

Unit – IV

Securing Network Transaction-Electronic Payment Systems: Introduction –Online Payment Systems-Pre-paid Electronic Payment System- Post-paid Electronic Payment System-Requirement Metrics of a Payment System

Unit – V

Search Engines and Directory Services: Information Directories –Search Engines –Internet Adverting- Agents in Electronic Commerce: Needs and Types of Agents-Agent Technologies Agents Standards and Protocols-Agents Applications-Case Study.

Reference books

1. Bharat Bhasker, "Electronic Commerce Framework, Technologies and Applications", Tata McGraw Hill Publication, 2003.

Course Contents and Lecture Schedule

Module No.	Topic	No.of Lectures
1	**Unit-I**	
1.1	Introduction to E-Commerce, Benefits of E-Commerce	2
1.2	Impacts of E-Commerce	1
1.3	Classification and Application of E-Commerce	2
1.4	Business Model	2
1.5	Architectural Frame Work	2
2	**UNIT-II**	
2.1	Network Infrastructure	3

2.2	TCP/IP Reference Model-Domain Name System	3
2.3	Information Distribution and Messaging	3
3	**UNIT-III**	
3.1	Information Publishing Technology	3
3.2	VRML- Securing the Business on Internet	3
3.3	Security Policy-Procedures and Practices-Securing the Web Service	3
4	**UNIT-IV**	
4.1	Securing Network Transaction-Electronic Payment Systems	3
4.2	Introduction –Online Payment Systems	2
4.3	Pre-paid Electronic Payment System	2
4.4	Requirement Metrics of a Payment System	2
5	**UNIT-V**	
5.1	Search Engines and Directory Services	3
5.2	Agents in Electronic Commerce	3
5.3	Agents Applications	3
	Total	45

Course Prepared By: Dr. D. Ramyachitra

Course Verified by: Dr.E.Chandra

DISTRIBUTED SYSTEMS

Subject Code: 19CS3E04 **No. of Credits: LP T**
4 0 4

Preamble

The objective of this course is to provide basic techniques in the design and development of distributed Systems and understanding the for solutions fundamental problems in distributed systems like, resource sharing, process distribution and communication, data distribution, synchronization, programming models, distributed file systems, virtualization, and the use of distributed system monitoring and debugging tools in problem solving.

Prerequisite

Basic knowledge on software system (operating system)

Course Outcome:

CO1	To know about the paradigms of a distributed system and the design principles	Understand
CO2	To understand the concepts of resource sharing and loading factors in distributed system for synchronization	Understand / Apply
CO3	To understand the concepts of designing the distributed models .To know the importance of distributed communication	Analyse / Apply
CO4	Ability to implement the real-time distributed systems	Apply
CO5	To understand how the targeted distributed system is designed	Understand / Analyse / Apply

S- Strong; M-Medium; L-Low

Assessment Pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	20	20	30	20
Understand	30	30	20	30
Apply	30	30	30	20
Analyse	20	20	20	30
Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Introduction about distributed system (CO1):

1. Define the term fully distributed.
2. Outline the fundamental models of distributed system
3. Write a short note on resource sharing?
4. Explain the design requirements for distributed architectures?
5. List the examples of distributed system.

Managing Resource Analysis (CO2):

1. Discuss the pros and con of distributed system
2. State the challenges of distributed system
3. Define loading factors.
4. Explain the concept of resource management.

5. Does evident aspect of Distributed system design is the division of responsibilities between the system components? Justify.

Design Analysis (CO3):

1. Explain the communication between distributed objects.

2. Define the term communication line loading.

3. Discuss about database decision trees.

4. Write a short note on data flow systems.

5. Write the importance of partitioning and allocation in distributed system.

Implementation and debugging (CO4):

1. Describe in detail about client- server model

2. Write down the principles of networking.

3. Mention the features of group communication.

4. Discuss the function of file server and an email server.

5. Write a short not on printer server.

Evaluation of distributed database (CO5):

1. Illustrate an assignment statement with the R project techniques of heterogeneous distributed database.

2. Explain the principle of distributed database with examples.

3. Define transparency.

4. Outline the characteristics of heterogeneity with example.

5. Interpret the various level of transparency involved in distributed database.

Syllabus:

Unit I: Distributed Systems: Fully distributed processing systems – Networks and Interconnection structures – Designing a Distributed Processing System.

Unit – II: Distributed Systems: Pros and Cons of Distributed processing – Distributed databases – the challenge of distributed data – loading factors – managing the distributed resources – division of responsibilities.

Unit – III: Design Considerations: Communications line loading – Line loading Calculations – Partitioning and allocation – Data flow systems – dimension analysis – network database design considerations – ration analysis – database decision trees – synchronization of network databases.

Unit – IV: Client/Server Network Model: Concept – file server – printer server – an e-mail server.

Unit – V: Distributed Databases: An overview – Distributed Databases – Principles of Distributed Databases – levels of transparency – Distributed Database Design – The R* Project Technique Problems of Heterogeneous Distributed Databases

Reference Books:

1. John A. Sharp, "An Introduction to Distributed and Parallel Processing, Blackwell Scientific Publications, 1987.
2. UylessD.Black, "Data Communications & Distributed Networks.
3. Joel M.Crichlow, "Introduction to Distributed & Parallel Computing .
4. StefansCeri, GinseppePelagatti, "Distributed Databases Principles and Systems, McGraw Hill Book Co., New York, 1985.

Course content and lecture schedule:

Module No.	**Topic**	**No. of Lectures**
1	**Introduction to Distributed System**	
1.1	Introduction on processing system and fully distributed system	1
1.2	Networking and interconnection structure	2
1.3	Designing a distributed system	2
2	**Distributed System Analysis**	
2.1	Pros cons of Distributed Processing	1
2.2	Distributed database and challenges distributed data	2
2.3	Loading factors	2
2.4	Division of responsibility	2
3	**Design Consideration**	
3.1	Communication line loading	2
3.2	Line loading calculation	2
3.3	Portioning and allocation	2

3.4	Data flow systems	2
3.5	Dimension analysis	2
3.6	Network database design consideration	2
3.7	Ratio analysis	2
3.8	Database decision trees	2
3.9	Synchronization of network database	2
4	**Client Server Model**	
4.1	Client server model concepts	2
4.2	File server	2
4.3	Printer server	1
4.4	An email server	2
5	**Distributed databases**	
5.1	Distributed database an overview	1
5.2	Principles of distributed database	1
5.3	Level of transparency	2
5.4	Distributed database design	2
5.5	The R * project technique problem	2
Total		**45**

Course Prepared by: Dr.P.B.pankajavalli

Course Verified by:Dr.E.Chandra

OPEN SOURCE TECHNOLOGIES

Subject Code: 16CS3E10 No. of Credits: L PT

0 0 4

Preamble

The objective of this course is to provide and understand of delivering excellent web development solutions that bring your ideas to life on the web. To be a global, customer-centric company enabling business to craft their unique & successful identities on the web and mobile.Open source technology is a growing trend in which the source code used to create the program is freely available for the public to view, edit, and redistribute. Any type of software program can be open source, including operating systems, databases, applications games, and even programming languages. The open source license encourages a shared community approach to the development, extension, and patching of open source software. Most open source projects have a dedicated group that moderates and directs the core software development and ensures that needed new features are being developed, bugs are being fixed, and the supporting documentation remains current. Sometimes an open source project will fork; meaning a group of developers will lead the development of the software that is independent of the original project. Improvements in the fork project could either become incorporated into the core project or evolve into a completely new project which transform leading edge technologies pool and trends into a constant value to accelerate business growth of our clients.

Prerequisite:

Linux, Multimedia, Computer Graphics

Course outcomes:

On the successful completion of the course students will be able to

CO1:	Understand the Open Source, Free Software, Free Software vs. Open Source software, Public Domain Software, History : BSD, The Free Software Foundation and the GNU Project, Philosophy	Understand
CO2:	Understand the Philosophy: Software Freedom, Open Source Development Model, Licenses and Patents, Economics of FOSS - Zero Marginal Cost, Income-generation opportunities, Problems with traditional commercial software, Internationalization	Understand
CO3:	Understand theOpen Source Platform and Technologies: The Open Source Platform–Operating Systems, Windowing Systems and Desktops, GIMP, Technologies Underlying Open	Understand/Analyse

	source Development.	
CO4:	Understand the Linux Application**:** Accessing and Running Applications-Multimedia in Linux : Listening to Audio, Playing video, Using Digital Camera, Recording music / video CDs. Publishing: Open office, Working with Graphics, Printing Documents, Displaying documents with Ghost script and Acrobat, Using Scanners driven by SANE	Understand/Analyse/ Apply
CO5:	Understand the PHP**:** Installing and Configuring PHP, Building Blocks of PHP, Flow control functions in PHP, Working with functions, arrays, objects and forms.	Understand/Analyse/Apply
CO6:	Understand the PHP and MySQL Integration**:** Database Design Process, Learning Basic SQL commands, Using Transactions and Stored Procedures in MySQL, Interacting with MySQL using PHP.	Understand/ Analyse/Apply

Mapping with programme outcomes:

Cos	**PO1**	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**
CO1	**S**	**M**		**M**		**M**				**L**		
CO2	**S**	**M**					**M**					**M**
CO3	**S**	**L**	**S**	**M**								**M**
CO4		**S**				**L**			**M**			**S**
CO5	**S**	**L**		**M**								**S**
CO6		**M**	**S**	**M**						**S**		**S**

S- Strong; M-Medium; L-Low

Assessment pattern:

Bloom's Category	**Continuous Assessment Test (%)**			**Terminal Examination**
	1	**2**	**3**	
Remember	20	20	20	20
Understand	30	30	30	30
Apply	20	20	20	20
Analyse	30	30	30	30

Evaluate	0	0	0	0
Create	0	0	0	0

Course level assessment questions:

Introductionto Open Source technology (CO1):

6. Define: Open source.
7. What are the benefits of free and open source software?
8. List out the examples of open source software?
9. Who created BSD?
10. Describe GNU project.

Philosophy(CO2):

11. How does the Free Software Foundation define free software?
12. What is open source software explain open source development model?
13. Explain licence and patent.
14. Define FOSS.
15. Describe zero marginal cost.

Open Source Platform and Technologies (CO3):

6. Define GIMP.
7. What are the open source operating systems?
8. List out the open source tools.
9. Explain windowing system and desktop.
10. Who introduced open source system?

Linux Application (CO4):

3. What is open source Linux?
4. What is SANE.
5. Explain Open office.
6. Explain audio/video.
7. List out the applications of linux.

PHP (CO5):

4. What is PHP?
5. Define: Crisp Sets.
6. Installing and Configuring PHP-explain.
7. Briefly describe Flow control functions in PHP.

8. Define objects.

PHP and MySQL Integration (CO6):

6. Briefly elaborate Database Design Process .
7. What is a stored procedure?
8. Describe MySQL using PHP.
9. What is database?
10. List out some SQL commands.

Syllabus:

Unit - I Introduction: Open Source - Free Software - Free Software vs. Open Source software - Public Domain Software - History : BSD - The Free Software Foundation and the GNU Project - Philosophy: Software Freedom - Open Source Development Model - Licenses and Patents - Economics of FOSS - Zero Marginal Cost - Income-generation opportunities - Problems with traditional commercial software - Internationalization.

Unit - II Open Source Platform and Technologies: The Open Source Platform–Operating Systems - Windowing Systems and Desktops - GIMP - Technologies Underlying Open source Development.

Unit - III Linux Application: Accessing and Running Applications-Multimedia in Linux : Listening to Audio, Playing video - Using Digital Camera, Recording music / video CDs. Publishing: Open office - Working with Graphics - Printing Documents - Displaying documents with Ghost script and Acrobat - Using Scanners driven by SANE

Unit - IV PHP: Installing and Configuring PHP - Building Blocks of PHP - Flow control functions in PHP - Working with functions – arrays - objects and forms.

Unit - V PHP and MySQL Integration: Understanding the Database Design Process - Learning Basic SQL commands - Using Transactions and Stored Procedures in MySQL, Interacting with MySQL using PHP

Reference Books:

1. Christopher Negus, Red Hat Linux Bible, Wiley Publishing, ISBN: 0-7645-4333-4.

2. Fadi P. Deek, James A. M. McHugh, Open Source Technology Cambridge University Press, 2008.
3. Julie C Melonie, PHP, MySQL and Apache, Pearson Education, ISBN: 81-297-0443-9.
4. http://en.wikibooks.org/wiki/Open_Source.

Course content and lecture schedule:

Module no	Topic	No of Lectures
1	**Introductionto Open Source**	
1.1	Open Source, Free Software	2
1.2	Free Software vs. Open Source software	2
1.3	Public Domain Software, History : BSD, The Free Software Foundation and the GNU Project	4
1.4	Philosophy: Software Freedom, Open Source Development Model,	3
1.5	Licenses and Patents, Economics of FOSS - Zero Marginal Cost,	2
1.6	Income-generation opportunities, Problems with traditional commercial software, Internationalization.	3
2	**Open Source Platform and Technologies**	
2.1	The Open Source Platform–Operating Systems,	2
2.2	Windowing Systems and Desktops, GIMP, Technologies Underlying Open source Development.	4
3	**Linux Application**	
3.1	Accessing and Running Applications-Multimedia in Linux : Listening to Audio, Playing video	3
3.2	Using Digital Camera, Recording music / video CDs.	3
3.3	Publishing: Open office, Working with Graphics,	2
3.4	Printing Documents, Displaying documents with Ghost script and Acrobat, Using Scanners driven by SANE	4
4	**PHP**	
4.1	Installing and Configuring PHP	2
4.2	Building Blocks of PHP, Flow control functions in PHP	2
4.3	Working with function arrays, objects and forms	2

5	**PHP and MySQL Integration**	
5.1	Understanding the Database Design Process	2
5.2	Learning Basic SQL commands	2
5.3	Using Transactions and Stored Procedures in MySQL	2
5.4	Interacting with MySQL using PHP	2
	Total	**48**

Course Prepared By: Dr.D.Napoleon

Course Verified by:Dr.E.Chandra

General Papers

Semester – III

Gap Analysis

Sub. Code: 18CS1G1 **No. of Credits: 1**

Goals and Objective:

This course is designed to Analyse the gap in the literature survey which they have done on II Semester. As per the guide instructions the gap will be identified and fulfilled by preparing complete literature survey. They will be motivated to present their papers in journals and conferences. Gap analysis helps the students in a better way by technical writing, paper presenting in conferences and future research direction.

Professional Development Courses (PDC)

Semester - III

Software Installation

Sub. Code: 18CS3PDC1 **No. of Credits: 1**

Goals and Objective:

This paper enable the students to learn the installation of any new concept/theme based tools/software, study and understanding the working procedure of the installed tool and giving demonstration by them to all students in the class. Upon completion of this course, students will have broad technical knowledge in all wide variety of tools/software used for different domains such as software engineering, speech recognition, network administration, security, image processing, data science and analytics etc. This paper really help the students to develop essential software installation skills and understanding the features presented in it.

Supportive Subjects

Suggested Code	Sem.	Title of the Paper	Credits		Marks
18CSS01	I/II/III	Windows and MS Word	2	2	50
18CSS02		Internet and HTML Programming	2	2	50
18CSS03		Relational Database Management System	2	2	50
18CSS04		Object Oriented Programming	2	2	50
18CSS05		Software Engineering	2	2	50
18CSS06		Multimedia Systems	2	2	50

WINDOWS AND MS WORD

No. of Credits: 2

UNIT I

Getting started –about OS – types of OS – mouse handling – pull down menu selection.

UNIT II

Window resizing – File manager operation – control panel operation – opening and closing files

UNIT III

Editing – cut, paste – copy to clipboard – creating icon – Creating group items.

UNIT IV

Introduction to common office tools and techniques – sharing information within MS Office – word basics – formatting text documents – working with header, footer and footnotes.

UNIT V

Tabs – tables and sorting – graphics – templates writer tools – macros – keyboard shortcuts – means – custom toolbars.

REFERENCES BOOKS

1. Microsoft Office‟ 2000 by woody Leonhard
2. Using Microsoft Office‟ 97 by Rick Winter and Patty Winter.

INTERNET AND HTML PROGRAMMING

No. of Credits: 2

UNIT I

Internet Basics – Origin of Interest – ARPANET – Protocol – Packet switching theory – TCP/IP address (classification), Domain name system (Concept of DNS Server) – Router.

UNIT II

Routing Algorithm (just introduction) – Direct & Dial up Networking – MODEM ISP (VSNL) Services (shell & TCP/IP ACC) Up load, down loan Protocols (ZMODEM, KERMIT etc)

UNIT III

Email – Newsgroup – FTP – Gopher – Origin of WWW – Origin of HTML – URL – Browsers (Text & Graphics) – HTTP - Search Engineers (Purpose & Facilities, Yohoo, Alta Vista Web crawler etc.

UNIT IV

Archie – Veronica – Telnet – Chat – What is meant by Website Homepage. Etc.

UNIT V

HTML Programming HTML – Basic Tags – Various versions of HTML – HTML forms – HTML frames – Browser (IE, Netscape communicator, Lynx (Text) Growser dependent – HTML tags.

REFERENCE BOOKS:

1. Using Microsoft Office „ 97 by Rick Winter and Patty Winter.
2. Advanced Internet for Dummies by Hohn Levine and Margaret Levine.
3. Asian Publishers Internet Concepts, problems and Solutions by Singh.

RELATIONAL DATABASE MANAGEMENT SYSTEMS

No. of Credits: 2

UNIT I

Introduction – purpose of database system data models – database languages – Transaction management – Storage management – DBA – database users – system structure

UNIT II

E-R model – Hierarchical model – Network Model.

UNIT III

Structure of Relational databases – Relational Commercial Languages SQL – Integrity Constraints.

UNIT IV

Normalization – Indexing and Hashing

UNIT V

Query Processing – Concurrency Control – Security

TEXT BOOKS:

1. Abraham Silberchatz, Henry K.Forth, Sudharshan, "Database system Concepts" – (3^{rd} edition) McGraw Hill.
2. Elisa Bettino, " Object Oriented Databases", Addison Wesley.

REFERENCE

1. Navethe/Elmasri, "Fundamentals of Database Systems", Addition Wesley, 1994

OBJECT ORIENTED PROGRAMMING

No. of Credits: 2

UNIT I

Drawback of structured programming – object oriented language characteristics and fundamentals – programming basics.

UNIT II

Loops, decisions – structures and functions – object and classes.

UNIT III

Overloading – Inheritance – Polymorphism

UNIT IV

Files – Streams – Templates

UNIT V

Exception handling – String handling

TEXT BOOKS

1. Strongstrup, " The C++ Programming Languages", (3rd edition) AW

REFERENCE

1. Robert Lafore, "Object Oriented Programming in Turbo C++," Galgotha publications Ltd 1996

SOFTWARE ENGINEERING

No. of Credits: 2

UNTI I

Introductions : Evolving role of software – Software characteristics, components and its applications – Generic view of software engineering – Software process models.

UNIT II

Systems Analysis : Requirements analysis – Analysis principles – Prototyping Software requirement specification – Data modeling, functional modeling and behavioral modeling.

UNIT III

Design concepts: Design and software quality, Design concepts : Abstraction, refinement, modularity, and software architecture control hierarchy structural partitioning and information hiding, Effective modular design: functional independence, cohesion and coupling – design documentation.

UNIT IV

Design Methods : Data design – Architectural design process: transform mapping and transaction mapping – interface design – procedural design. Design for Real – Time Systems : System considerations– real time systems – analysis and simulation of real time systems.

UNIT V

Software Testing Methods : Software testing fundamentals. White box testing: basis path testing and control structure testing – black box testing – testing for specialized environments. Software Testing Strategies: A strategic approach to software testing – unit testing – integration testing – validation testing

– system testing.

TEXT BOOK :

1. R.S.Pressman ”Software Engineering”, (5^{th} edition) Tata McGraw Hill, 1997.

MULTIMEDIA SYSTEMS

No. of Credits : 2

UNIT I

Multimedia in use and technology Introducing Multimedia – Multimedia definition need, benefits and problems – system components – Multimedia platforms – development tools – types – cross platform compatibility – commercial tools – standards.

UNIT II

Media type Non temporal – text image, graphics, Temporal – analog, digital audio/video, music animation, other media types – Extended Images, digital ink, speech audio.

UNIT III

Digital video and Image compression – Evaluating an compression system – Redundancy and visibility

UNIT IV

Video compression Techniques – Image Compression Standards – JPEG, MPEG, DVI

UNIT V

Applications – Media in real world – Multimedia and single user – Multimedia on networks – Training and education.

TEXT BOOKS:

1. Judith Jeffcott, MULTIMEDIA IN PRACTICE Technology and Application chapters: 1,2,3,12,13 printice Hall, 1995
2. Simon J Bibbs&DionysionC.Tsichrikzis. MULTIMEDIA PROGRAMMING chapters : 2,3,4,5, Addision Wesley, 1994
3. MULTIMEDIA SYSTEM– John F.Koegel Buford, Addision Wesley 1994