

GOVERNMENT COLLEGE OF ENGINEERING, AURANGABAD
(An Autonomous Institute of Govt. of Maharashtra)
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**Scheme & Syllabus of
Master of Computer Applications
(MCA)
2 Years Batch 2020 onwards**

**SYMCA
Semester-III and Semester-IV**

**By
Departmental Board of Study
(Master of Computer Applications)
Department of Master of Computer Application
Government College of Engineering, Aurangabad**

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	1	-	4	20	20	60	100

Course Objectives

- 1 Explain the use of advance Java in application development
- 2 Evaluate the role of servlets, swing and AWT for web application development.
- 3 Develop JSP applications as per the requirement of the IT industry.

Course Outcomes- After studying this course, students will be able to

- CO 1 Develop distributed applications using RMI
- CO 2 Develop web application using Java Servlet and JavaServer Pages technology.
- CO 3 Gain the knowledge of MVC Architecture.
- CO 4 Convert their project to layered MVC Architecture
- CO 5 Implement the advanced environment using Hibernate, Struct, Spring in their Application

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Introduction to Networking and RMI Basics Of Networking, Overview Of The OSI Model, Socket Programming, Client Sockets And ServerSocket, Multicast Sockets RMI: Introduction To Distributed Computing, RPC, Introduction To RMI, Stubs And Skeletons, The Process Of Creating A Simple RMI Application	6
2	Servlets Introduction To Web Application Development, Introduction of a 2 & 3 Tier Architecture, Server Side Programming, Introduction To Servlets, Comparing Servlets With CGI, Servlet Lifecycle, Servlet With Html, Server Side Includes, Servlet Chaining, HTTP Tunneling, Session Management, Servlets With JDBC, Inter Servlet Communication, Deployment Descriptor (web.XML), Servlet Context &Config Objects, Event Handling in Servlet, Jasper Report generation & Calling Using Servlet.	6
3	Java Server Page and MVC Architecture Introduction, Difference between Servlet &JSP ,Basic Tags (Scriptlet, expression, directives ,declaration), Basic Objects (out, session, request, application), Action tags(forward, include etc.), Java Server Tag Library Introduction to MVC, Role of MVC in Servlet and JSP architecture.	6
4	Hibernate, Structs and Spring Introduction, difference between hibernate &JDBC, Architecture of hibernate & ORM understanding, Steps to configure hibernate & create sample program, Introduction to HQL & work with database Struct: Introduction &History, Struts with Hibernate, Struts with Spring, Struts with JDBC, Spring : Spring Core Module, Spring J2EE module, Spring ORM, Spring JDBC, Spring AOP(Aspect Oriented Module),Spring Web MVC module	6

5 **Maven project and Web services** 6

Maven :What is Maven, ANT Vs Maven, Install Maven, Maven Repository, Local Repository, Central Repository, Remote Repository, Maven Pom.xml, Maven Example, Maven Web App, Maven Plugin

Web service :WS Components, SOAP Web Service, RESTful Web Service, SOAP vs RESTSOA, Java Web Services

J-unit Testing: Types of JunitTesting, Assert Classes

JAXB : What is JAXB, features of JAXB, Object to XML, XML to Object

Text Books

- 1 C. Xavier, Java Programming: A practical approach, McGraw Hill India Education 2011.
- 2 1. Herbert Schildt, —The Complete Reference – Java 2, 8th Edition, Tata McGraw Hill, 2011.

Reference Books

- 1 E. Balagurusamy, PROGRAMMING WITH JAVA – A PRIMER, 4th Edition, Tata McGraw-Hill, 2010
- 2 Core Java Part 2 Advanced Features – Sun Microsystems press
- 3 J2EE™ Tutorial, The, 2nd Edition By Eric Armstrong, Jennifer Ball, Stephanie Bodoff, Stephanie Bodoff, Debbie Carson, Ian Evans, Dale Green, Kim Haase, Eric Jendrock. Published by Addison Wesley
- 4 Java Design Patterns: A Tutorial by James W. Cooper Addison Wesley Pearson Press
- 5 Struts in Action – Ted Husted

E Books/ Online learning material

- 1 <https://www.edureka.co/blog/advanced-java-tutorial>
- 2 <https://www.w3schools.in/java-tutorial/>
- 3 <https://nptel.ac.in/courses/106/105/106105191/>

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	3	2		1								1	1	
CO 2	1	3	2												
CO 3	1	3	2												
CO 4	1	3	2					1	1	1	1	1	1	1	1
CO 5	1	3	2		1		1								

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
2. Co-operative learning
3. Questioning to check for understanding
4. Plenty of practice
5. Be flexible about how long it takes to learn
6. Get students working together

Teachers' Assessment:

Teachers' assessment will be based on one or many of the following

1. Multiple choice questions
2. Assignments
3. Power Point Presentation on allotted topics
4. Quiz
5. Surprise test
6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2102

Course Title- ASP.Net and C#

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
4	-	-	4	20	20	60	100

Course Objectives

- 1 Develop dynamic web applications, create and consume web services
- 2 Use appropriate data sources and data bindings in ASP.NET web applications
- 3 Provide the knowledge of Dot Net Frameworks along with C#

Course Outcomes- After studying this course, students will be able to

- CO 1 Understand the ASP.NET web application execution model.
- CO 2 Understand web application configuration and demonstrate the ability to manage basic configuration issues.
- CO 3 Define and describe what a web service is and how web services are used.
- CO 4 Create and consume libraries
- CO 5 Building windows application

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Getting Started with .NET: Introduction to .NET Framework and Visual Studio.NET, Kind of Applications that can be developed using Visual Studio.NET, Website v/s Web Application, Creating a new sample Web Project with Visual Studio Creating Presentation Layer: Creating Front-End with the HTML & CSS, Grid Layout v/s Liquid Layout, using Cascaded Style Sheets	6
2	Introduction to C#: Working with Variables, Data Types, Data Type Conversion, Operators and Expressions, Creating Classes and Objects in C#, Using Namespaces, Arrays, Exception Handling in C#, Navigating amongst Web Pages, Event Handling Important Files and Folders in Web Application: All System Folders, Web.Config, Global.asax, Building sites with Master Pages, Using User Controls	6
3	Building ASP.NET Pages: Standard Controls, Validation Controls, State Management: ASP.NET PageLife Cycle, Session Management, Managing Query String, View State in C#	6
4	Working with Data: ADO.NET Architecture, Connected & Disconnected Architectures, SQL Connection, SQL Command & important Classes for operating database related operations (CRUD), Using Datasets& Data Adapters Working with Data Controls: Grid View, Repeater Control	6
5	AJAX: Ajax Architecture, Script Manager, Update Panel, Ajax Control Toolkit Web Services: Creating and Consuming Web Services Deploying ASP.NET Websites: Installing and configuring website using IIS	6

Text Books

- 1 Professional ASP.NET MVC 5 (WROX) – Jon Galloway and Brad Wilson
- 2 ASP.NET 3.5 unleashed – Stephan Walther
- 3 Programming ASP.NET CORE – Dino Esposito
- 4 C# in Depth – Jon Skeet

Reference Books

- 1 The Complete Reference ASP.NET – Tata McGrow Hill
- 2 The Complete Reference C#
- 3 ASP.NET Programming – Murach
- 4 Microsoft ASP.NET 4.0 Step by Step – George Shepherd , Microsoft Press
- 5 Mastering ASP.Net – BPB Publication

E Books/ Online learning material

- 1 https://www.tutorialspoint.com/asp.net_mvc/asp.net_mvc_useful_resources.html
- 2 <https://www.w3schools.com/asp/default.ASP>

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PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2											1	1	
CO 2	1	2											1	1	
CO 3	1	2	3										1	1	
CO 4	1	2	3		2							1		1	1
CO 5	1	2	3							1	1				

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

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Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2103

Course Title- Cloud Computing

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	1	-	4	20	20	60	100

Course Objectives

- 1 Identify the technical foundations of cloud systems architectures.
- 2 Analyze the problems and solutions to cloud application problems.
- 3 Apply principles of best practice in cloud application design and management.
- 4 Identify and define technical challenges for cloud applications and assess their importance.

Course Outcomes- After studying this course, students will be able to

- CO 1 Distinguish between different types of architectures and services in the Cloud Computing.
- CO 2 Understanding management in cloud computing.
- CO 3 Applying the cloud technology in real life application development.
- CO 4 Analyze different security issues and challenges in cloud computing.
- CO 5 Explain the core issues of cloud computing such as security, privacy, and interoperability.

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Basics of Cloud Computing: Overview, Applications, Intranets and the Cloud. Your Organization and Cloud Computing- Benefits, Limitations, Security Concerns. Software as a Service (SaaS)- Understanding the Multitenant Nature Of SaaS Solutions, Understanding SOA. Platform as a Service (PaaS)- IT Evolution Leading to the Cloud, Benefits of PaaS Solutions, Disadvantages of PaaS Solutions. Infrastructure as a Service (IaaS)- Understanding IaaS, Improving Performance through Load Balancing, System and Storage Redundancy, Utilizing Cloud-Based NAS Devices, Advantages, Server Types.	6
2	Data Storage and Security in Cloud: Cloud file systems: GFS and HDFS, BigTable, HBase and Dynamo Cloud data stores: Data store and Simple DB, Cloud Storage-Overview, Cloud Storage Providers. Securing the Cloud- General Security Advantages of Cloud-Based Solutions, Introducing Business Continuity and Disaster Recovery. Disaster Recovery- Understanding the Threats.	6
3	Virtualization: Implementation Levels of Virtualization, Virtualization Structures/Tools and Mechanisms, Types of Hypervisors, Virtualization of CPU, Memory, and I/O Devices, Virtual Clusters and Resource Management, Virtualization for Data-Centre Automation. Common Standards: The Open Cloud Consortium, Open Virtualization	6

Format, Standards for Application Developers: Browsers (Ajax), Data (XML, JSON), Solution Stacks (LAMP and LAPP), Syndication(Atom, Atom Publishing Protocol, and RSS), Standards for Security.

- 4 **Cloud Service Providers:** 6

Amazon Web Services-Elastic Compute Cloud (EC2), Simple Storage Service (S3), Simple Queue Service (SQS), Elastic Block Storage (EBS), Elastic Load Balancing (ELB), SimpleDB, Relational Database Service (RDS), Virtual Amazon Cloud, Google- AppEngine, Google Storage, Windows Azure, Rackspace Cloud

- 5 **Cloud Applications:** 6

Business and Consumer Applications- CRM & ERP, Productivity, Social Networking, Media Applications, Multiplayer Online Gaming, E-Commerce Applications, , Cloud for e-Governance, Scientific Applications- Healthcare, Biology, Geoscience etc.

Future of Cloud Computing:

How the Cloud Will Change Operating Systems, Location-Aware Applications, Intelligent Fabrics, Paints, and More, The Future of Cloud TV, Future of Cloud-Based Smart Devices, Faster Time to Market for Software Applications, Home-Based Cloud Computing, Mobile Cloud, Autonomic Cloud Engine, Multimedia Cloud, Energy Aware Cloud Computing, Jungle Computing. Future Research Directions and Challenges in Cloud Computing, Case Studies.

Text Books

- 1 Cloud Computing: SaaS, PaaS, IaaS, Virtualization and more ,Dr. Kris Jamsa, Wiley Publications.
- 2 Cloud Computing: Principles and Paradims, RajkumarBuyya, James Broberg, AndrzejGoscinski, Wiley Publication, 1st Edition
- 3 Mastering Cloud Computing, RajkumarBuyya, Christian Vecchiola, S ThamaraiSelvi, McGraw Hill Publication, 1st Edition
- 4 ENTERPRISE CLOUD COMPUTING Technology Architecture, Applications, GautamShrof ,Cambridge University Press, ISBN: 9780511778476

Reference Books

- 1 Cloud Computing Insight into New-Era Infrastructure, Dr. Kumar Saurabh,Wiley IndiaPvt. Ltd., 1st Edition
- 2 Cloud Computing: A Practical Approach, Anthony T. Velte, Tata McGraw Hill, 2009
- 3 Guide to Cloud Computing: Principles and Practices, Richard Hill, Laurie Hirsch, PeterLake, SiavashMoshiri, Springer, 1st Edition
- 4 Enterprise Cloud Computing,GautamShroff, Cambridge, 1st Edition
- 5 Cloud Security and Privacy, Tim Mather, Subra K, Shahid L.,Oreilly, 1st Edition

E Books/ Online learning material

- 1 <http://nptel.ac.in/courses/106106129/28>
- 2 <https://cloudacademy.com/courses/>
- 3 <https://www.lynda.com/Cloud-Computing-training-tutorials/1385-0.html>
- 4 <http://scpd.stanford.edu/search/publicCourseSearchDetails.do?method=load&courseId=11815>

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2												1	1
CO 2	1	2												1	1
CO 3	1	2	3											1	1
CO 4	1	2	3		2							1		1	1
CO 5	1	2	3						1	1					

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
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6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2104

Course Title- Software Quality Assurance

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	-	-	3	20	20	60	100

Course Objectives

- 1 Introduce basic concepts of software testing
- 2 Understand the importance of software quality and assurance software systems development.
- 3 Demonstrate Software Quality Tools and analyze their effectiveness.

Course Outcomes- After studying this course, students will be able

- CO 1 Describe fundamental concepts of software quality assurance
- CO 2 Utilize the concepts in software development life cycle.
- CO 3 Assess the quality of software product and Configure and carry out automatic testing of software
- CO 4 Apply the concepts in preparing the quality plan & documents.
- CO 5 Demonstrate the skill set as a tester to neutralize the consequences of wicked problems by narrating effective test cases and test procedures and to Demonstrate their capability to adopt quality standards.

Course Contents

Unit No	Detailed Contents	Contact Hours
1	INTRODUCTION TO SOFTWARE QUALITY & ARCHITECTURE Need for Software quality – Quality challenges – Software quality assurance (SQA) – Definition and objectives – Software quality factors- McCall quality model – SQA system and architecture – Software Project life cycle Components – Pre project quality components – Development and quality plans.	6
2	SQA COMPONENTS AND PROJECT LIFE CYCLE Software Development methodologies – Quality assurance activities in the development process- Verification & Validation – Reviews – Software Testing – Software Testing implementations – Quality of software maintenance – Pre-Maintenance of software quality components – Quality assurance tools – CASE tools for software quality – Software maintenance quality – Project Management.	6
3	SOFTWARE QUALITY INFRASTRUCTURE Procedures and work instructions - Templates - Checklists – 3S development - Staff training and certification Corrective and preventive actions – Configuration management – Software change control – Configuration management audit - Documentation control – Storage and retrieval.	6
4	SOFTWARE QUALITY MANAGEMENT & METRICS Project process control, Computerized tools, Software quality metrics, Objectives of quality Measurement, Process metrics, Product metrics, Implementation, Limitations of software metrics, Cost of software quality, Classical quality cost model, Extended model, Application.	6

5 STANDARDS, CERTIFICATIONS & ASSESSMENTS 6

Quality management standards – ISO 9001 and ISO 9000-3 – capability Maturity Models – CMM and CMMI assessment methodologies - Bootstrap methodology – SPICE Project – SQA project process standards – IEEE st 1012 & 1028 – Organization of Quality Assurance – Department management responsibilities – Project management responsibilities – SQA units and other actors in SQA systems.

Text Books

- 1 Daniel Galin, “Software Quality Assurance”, Pearson Publication, 2009.
- 2 Effective Methods for Software Testing, Third edition, William E. Perry, Wiley India, 2009
- 3 Software Testing – Principles and Practices, NareshChauhan, Oxford University Press, 2010.
- 4 Software Quality Assurance, MilindLimaye, Tata McGraw-Hill, 2011.

Reference Books

- 1 Alan C. Gillies, “Software Quality: Theory and Management”, International Thomson Computer Press, 1997.
- 2 Software Testing and Quality Assurance Theory and Practice by KshirsagarNaik, PriyadarshiTripathy
- 3 Software Quality Engineering – Testing, Quality Assurance and Quantifiable Improvement, Jeff Tian, Wiley India, 2006.
- 4 Software Quality – A Practitioner’s approach, Kamna Malik, Praveen Choudhary, Tata McGraw-Hill, 2008.
- 5 Total Quality Management, Prentice Hall, 2003. Dale H. Besterfield

E Books/ Online learning material

- 1 <https://www.udemy.com/course/introduction-to-software-testing-or-software-qa/>
- 2 <https://nptel.ac.in/courses/106/105/106105150/>
- 3 <https://nptel.ac.in/courses/106/101/106101061/>

Mapping of COs and POs

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CO 1		1	2		1								1	1	
CO 2	1	1	2									1			
CO 3	1	1	2							1					
CO 4	1	1	2					1	1				1	1	1
CO 5	1		2		1			1			1				

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
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Teachers' Assessment:

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1. Multiple choice questions
2. Assignments
3. Power Point Presentation on allotted topics
4. Quiz
5. Surprise test
6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2105

Course Title- Enterprise Resource Planning

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	-	-	3	20	20	60	100

Course Objectives

- 1 To provide a contemporary and forward-looking on the theory and practice of Enterprise Resource Planning Technology.
- 2 To aim at preparing the students technological competitive and make them ready to self-upgrade with the higher technical skills
- 3 To train the students to develop the basic understanding of how ERP enriches the business organizations in achieving a multidimensional growth.

Course Outcomes- After studying this course, students will be able

- CO 1 Make basic use of Enterprise software, and its role in integrating business functions
- CO 2 Analyze the strategic options for ERP identification and adoption.
- CO 3 Design the ERP implementation strategies.
- CO 4 Create reengineered business processes for successful ERP implementation.
- CO 5 Describe the importance of integrated information system in organization

Course Contents

Unit No	Detailed Contents	Contact Hours
1 Introduction	What is ERP, Why ERP, Need for Enterprise Resource Planning, Definition of ERP, Evolution of Enterprise Resource Planning, Pre material requirement planning (MRP stage) Material requirement planning, MRP- II, ERP, Extended ERP, ERP Planning –II, ERP-A manufacturing perspective, Risks and benefits – ,Risk implementation, Fundamental technology of ERP Issues to be consider in planning design and, implementation of cross functional integrated ERP systems.	6
2 ERP Solution and Functional Modules	Overview of ERP software solutions, Small, medium and large enterprise vendor solutions, Business process Reengineering, Business process Management, Steps of BPM, Functional Modules, ERP Production planning module, ERP purchasing module, ERP Inventory control module, ERP Sales module, ERP Marketing module, ERP Financial module, ERP HR module	6
3 ERP Implementation	Planning Evaluation and selection of ERP systems, ERP Implementation life cycle, Pre-evaluation Screening, Package Evaluation, Project Planning Phase, Gap-Analysis, Reengineering, Configuration Implementation Team Training, Testing, Going Live, End-user training, Post – implementation, ERP implementation, Methodology and Frame work, Training, Data Migration, People Organization in implementation, Consultants and Vendors, Employees.	6
4 Post Implementation	ERP Implementation, Maintenance of ERP, Organizational and Industrial impact, Success factors of ERP Implementation, Key success factors, Failure	6

5	Emerging Trends on ERP	6
C	Extended ERP systems and ERP add-ons, CRM, Benefits of ERP Module, Supply Chain Management (SCM), Business analytics & Intelligence, Wireless Technology used in ERP, Future trends in ERP, Cloud Computing, SAP and the Internet	

Text Books

- 1 Enterprise Resource Planning – Alexis Leon – Second Edition – TMH
- 2 Enterprise resource planning, Vinod Kumar Garg, N. K. Venkita Krishna, 2nd Edition , PHI, 2003
- 3 ERP in practice – Vaman – TMH

Reference Books

- 1 ERP in practice – Vaman - TMH
- 2 Enterprise Resource Planning Systems, Daniel E.O'Leary, Cambridge University Press,2002
- 3 Concepts in Enterprise resource planning, Ellen Monk, Bret Wagner, Cengage learning, Third edition, 2009.
- 4 Essentials of Business Processes and Information Systems, by Simha R. Magal and Jeffrey Word,2010,
- 5 ERP-A Managerial Perspective, S. Sadagopan, McGraw Hill

E Books/ Online learning material

- 1 www.oracle.com/ERP
- 2 www.sap.com
- 3 www.openerp.com
- 4 <https://nptel.ac.in/courses/110/105/110105083/>
- 5 <https://www.coursera.org/lecture/enterprise-systems/1-1b-introduction-to-enterprise-resource-planning-erp-LneSo>

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CO 1	1	1											1	1	
CO 2	1														1
CO 3	1	1	2											1	
CO 4		1	2		2						1		1	1	
CO 5	1	2							1	1					1

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
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Teaching Strategies:

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6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2106

Course Title- E-Governance

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	-	-	3	20	20	60	100

Course Objectives

- 1 To develop knowledge of e-governance and e-government.
- 2 To know different e-governance models and infrastructure development
- 3 To implement security and use data warehousing and mining in e-governance

Course Outcomes- After studying this course, students will be able to

- CO 1 Gain a familiarity with the basic concepts, terminology and technology of government.
- CO 2 In-depth understanding of e-governance and the necessary experience to ensure successful implementation of the same
- CO 3 Increased confidence to drive change and operate online management through e-governance within your organization
- CO 4 A more secure career by introducing the newest form of governance within the organization, in turn, building one's competency and competitiveness with market standards
- CO 5 Develop skills to critically evaluate E-readiness and strategies

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Overview of E-Government and E-Governance, Stages of E-Governance, National E- Governance Plan (NeGP), Mission Mode Projects and their implementation status, E-Governance , Introduction to E-governance, Role of ICT's in e-governance, Need, importance of E-governance	6
2	Categories of E-governance, Key Issues of E-Governance, Technology, Policies, Infrastructure, Training, Copyrights , Consulting Funds, E-governance Models, Model of Digital Governance, Broadcasting /Wider Dissemination Model	6
3	Critical Flow Model, Interactive-service model/Government –to-Citizen-to-Government Model (G2C2G), Major areas of E-governance Services, Public Grievances: Telephone, Ration card, transportation, Rural services Land Records, Police: FIR registration, Lost and found, Social services: Death, domicile, school certificates	6
4	Public information: employment, hospitals, railway, Agricultural sector: Fertilizers, Seeds, Utility payments Electricity, water, telephone, Commercial: income tax, custom duty, excise duty-Governance Infrastructure, stages in evolution and strategies for success, -Governance Infrastructure, stages in evolution and strategies for success	6
5	Human Infrastructural preparedness, Challenges against E-governance, Study of E-governance initiatives in Indian states, E-readiness, Legal Infrastructural preparedness	6

Text Books

- 1 Governance.Com: Democracy in the Information Age, Elaine CiullaKamarck
- 2 Egov: E-business Strategies for Government by Douglas Holmes

Reference Books

- 1 Electronic Government: Design, Applications and Management, AkeGronlund (Editor).
- 2 Gordon, E. (2013). Beyond Participation: Designing for the Civic Web. Journal of Digital and Media Literacy, 1(1). Available at: <http://www.jodml.org/2013/02/01/design-for-civic-web/>
- 3 Reinventing Government in the Information Age : International Practice in IT-enabled Public Sector Reform, Richard Heeks(Editor),Routledg,January 2001
- 4 Silcock, R. (2001). What is e-government?. Parliamentary Affairs, 54, 88-101
- 5 Wong, K., Fearon, C. & Philip, G. (2007). Understanding e-government and e-governance: Stakeholders, partnerships and CSR.

E Books/ Online learning material

- 1 Visit: <http://www.blogs.state.gov/>, <http://www.ready.gov>,
- 2 Review: issue briefs and other information regarding libraries and e-government at <http://ipac.umd.edu/survey/analysis/e-government-public-libraries>.

Mapping of COs and Pos

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1											1	1	
CO 2	1														1
CO 3	1	1	2										1		
CO 4		1	2		2							1		1	1
CO 5	1	2							1	1					1

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
2. Co-operative learning
3. Questioning to check for understanding
4. Plenty of practice
5. Be flexible about how long it takes to learn

6. Get students working together.

Teachers' Assessment:

Teachers' assessment will be based on one or many of the following

1. Multiple choice questions
2. Assignments
3. Power Point Presentation on allotted topics
4. Quiz
5. Surprise test
6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2107

Course Title- Mobile Technology

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	-	-	3	20	20	60	100

Course Objectives

- 1 To know the evolution of Mobile communication and cell concept to improve capacity of the system.
- 2 Describe basic principles of the modern mobile and wireless communication systems.
- 3 Describe the development and implementation of mobile communication system.

Course Outcomes- After studying this course, students will be able to

- CO 1 To understand concepts of Mobile Communication.
- CO 2 To analyse next generation Mobile Communication System.
- CO 3 Analyse various protocols of all layers for mobile and ad hoc wireless communication network
- CO 4 Explain the principles and theories of mobile computing technologies.
- CO 5 Describe the possible future of mobile computing technologies and applications.

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Introduction to Mobile Computing Concept of Mobile Communication, Different generations of wireless technology, Basics of cell, cluster and frequency reuse concept, Noise and its effects on mobile, Understanding GSM and CDMA, Basics of GSM architecture and services like voice call, SMS, MMS, LBS, VAS, Different modes used for Mobile Communication, Architecture of Mobile Computing(3 tier),	6
2	Mobile computing architecture: Characteristics of Mobile Communication, Application of Mobile Communication, Security Concern Related to Mobile Computing, Middleware and Gateway required for mobile Computing, Making Existing Application Mobile Enable, Mobile IP, Basic Mobile Computing Protocol, Mobile Communication via Satellite • Low orbit satellite • Medium orbit satellite • Geo stationary satellite Satellite phones.	6
3	Introduction to Android: Overview of Android, What does Android run On – Android Internals?, Android for mobile apps development, Environment setup for Android apps Development, Framework – Android SDK, Eclipse, Emulators – What is an Emulator / Android AVD? Android Emulation – Creation and set up, First Android Application	6
4	Introduction to iOS: iOS Architecture, Environment Setup, Delegates, UI Controls, UI Views, UI Bars, Graphics, Audio & Video, Accessing Maps in Applications, File Handling, Notifications, Location	6
5	Introduction to Mobile Networks(Telecom Fundamentals & 2G, 3G) Telecom Basics & Cellular principles, Analog& digital modulations and	6

multiple access Techniques, GSM(2G), GSM Air interface &channel structure, Protocol Basics, Call Processing: Message and signalling flows, Handover Scenarios Migration from 2G to 3G, UMTS Services and Applications, Air Interface dynamics and various Concepts, Call Processing, High Speed Packet Access (HSDPA, HSUPA)

Long Term Evolution (LTE), VOIP, SIP, IMS and OSS(Billing):

Improvements & Evolution from 3G, LTE Architecture, LTE protocol architecture, services and applications, LTE Protocols, LTE Interfaces, LTE Air Interfaces, LTE Call Sequences, Handover Scenarios, LTE Integration with IMS, WLAN, WiFi, Wimax, 3GPP, non-3GPP access systems, Voice solutions in LTE: CSFB and VOLTE. Introduction to VOIP, Introduction to H.323, SIP, MGCP, Session Initiation protocol (SIP) & SDP, RTP, RTCP, IP Multimedia Subsystem (IMS), Kenon (online & offline) billing

Text Books

- 1 Reto Meier Professional ANDROID 4 Application Development, WROX Latest Edition
- 2 Mobile Computing (Technology, Applications and Service Creation) Asoke. K Talukder and Roopa R. Yavagal. TATA McGRAW HILL, 2nd Edition
- 3 Frank Adelstein, Fundamentals of Mobile and Pervasive Computing, TATA McGRAW HILL, 3rd Edition

Reference Books

- 1 Neil Smyth, 'Android Studio Development Essentials', 6th edition by Neil Smyth
- 2 Michael Owens, 'The Definitive Guide to SQL Lite' 2nd Apress Berkely, CA, USA 2010
- 3 L Murphy , 'Beginning Android Mark', 1st edition, Wiley India Pvt Ltd
- 4 Y Hashimi and Satya Komatineni, 'Pro Android Sayed', 1st edition, Wiley India Pvt Ltd
- 5 Reto Meier, 'Professional Android to Application Development', 2nd edition, Wiley India Pvt Ltd

E Books/ Online learning material

- 1 <https://nptel.ac.in/courses/106/106/106106147/>
- 2 <http://www.tutorialspoint.com/android/>
developer.android.com/training/basics/firstapp
- 3 <http://pl.cs.jhu.edu/oose/resources/android/Android-Tutorial.pdf>
- 4 <https://www.tutlane.com/tutorial/ios/ios-tutorial>

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1			1								1	1	
CO 2	2	1	1									1			
CO 3	2	1								1			1	1	
CO 4	2	1	1					1	1						1
CO 5	2				1			1			1				

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
2. Co-operative learning
3. Questioning to check for understanding
4. Plenty of practice
5. Be flexible about how long it takes to learn
6. Get students working together.

Teachers' Assessment:

Teachers' assessment will be based on one or many of the following

1. Multiple choice questions
2. Assignments
3. Power Point Presentation on allotted topics
4. Quiz
5. Surprise test
6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- MC2108

Course Title- Block Chain

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	-	-	3	20	20	60	100

Course Objectives

- 1 Understand how Blockchain systems.
- 2 To securely interact with them,
- 3 Integrate ideas from Blockchain technology into their own projects.

Course Outcomes- After studying this course, students will be able

- CO 1 To understand the basic fundamentals of Blockchain
- CO 2 To introduce Bit Coin Block chain
- CO 3 To explain Blockchain creation process
- CO 4 To know the importance of Hyper-ledger
- CO 5 To discuss the emerging trends in Blockchain and Use cases

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Introduction – Basic ideas behind Blockchain, how it is changing the landscape of digitalization, introduction to cryptographic concepts required, Hashing, public key cryptosystems, private vs public, Blockchain and use cases, Hash Puzzles, Introduction to Bitcoin Blockchain	6
2	Bitcoin Blockchain and scripts, Use cases of Bitcoin Blockchain scripting language in micropayment, escrow etc Downside of Bitcoin – mining: Mining explained, The Bitcoin network, The Bitcoin Mining Process, Mining Developments	6
3	Asymmetric key cryptography: AES structure, Analysis of AES , Key distribution Asymmetric key Ciphers: Principles of public key cryptosystems, RSA algorithm, Analysis of RSA, Diffie-Hellman Key exchange	6
4	Alternative coins – Ethereum and Smart contracts, Alternative coins – Ethereum continued, IOTA, The real need for mining – consensus – Byzantine Generals Problem, and Consensus as a distributed coordination problem – Coming to private or permissioned block chains	6
5	Introduction to Hyperledger, Permissioned Blockchain and use cases – Hyperledger, Corda Uses of Blockchain in E-Governance, Land Registration, Medical Information Systems, and others	6

Text Books

- 1 Mastering Bitcoin: Unlocking Digital Cryptocurrencies, by Andreas Antonopoulos
- 2 Arvind Narayanan, Joseph Bonneau, Edward Felten, Andrew Miller and Steven Goldfeder, Bitcoin and Cryptocurrency Technologies: A Comprehensive Introduction, Princeton University Press (July 19, 2016).
- 3 Blockchain by Melanie Swa, O'Reilly

Reference Books

- 1 Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System
- 2 Blockchain Applications: A Hands-on Approach by Arshdeep Bahga and Vijay K. Madisetti,
- 3 Nicola Atzei, Massimo Bartoletti, and Tiziana Cimoli, A survey of attacks on Ethereum smart contracts
- 4 Mastering Bitcoin: Programming The Open Blockchain, Andreas M. Antonopoulos, O'Reilly,
- 5 Matthew Connor, "Blockchain: Ultimate Beginner's Guide to Blockchain Technology- Cryptocurrency, Smart Contracts, Distributed Ledger, Fintech, and Decentralized Applications" Kindle Edition, 2017

E Books/ Online learning material

- 1 Hyperledger Fabric - <https://www.hyperledger.org/projects/fabric>
- 2 https://nptel.ac.in/content/syllabus_pdf/106104220.pdf
- 3 <https://www.coursera.org/courses?query=blockchain&page=1>

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1			1								1	1	
CO 2	2	1	1									1			
CO 3	2	1								1			1	1	
CO 4	2	1	1						1	1					1
CO 5	2				1			1			1				

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
2. Co-operative learning
3. Questioning to check for understanding
4. Plenty of practice
5. Be flexible about how long it takes to learn
6. Get students working together.

Teachers' Assessment:

Teachers' assessment will be based on one or many of the following

1. Multiple choice questions
2. Assignments
3. Power Point Presentation on allotted topics
4. Quiz
5. Surprise test
6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- **MC2109**Course Title- **Machine Learning**

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA	ESE	Total
3	-	-	3	20	20	60	100

Course Objectives

- 1 Have a good understanding of the fundamental issues and challenges of machine learning
- 2 Have an understanding of the strengths and weaknesses of many popular machine learning approaches
- 3 Be able to design and implement various machine learning algorithms in a range of real-world applications.

Course Outcomes- After studying this course, students will be able to

- CO 1 To understand basics of machine learning techniques
- CO 2 To become aware of various parametric and non-parametric methods in machine learning
- CO 3 Devise/develop machine learning model for real time applications
- CO 4 To understand basics of neural networks.
- CO 5 Develop skills of using recent machine learning techniques and solve practical problems.

Course Contents

Unit No	Detailed Contents	Contact Hours
1	Probability Theory, Linear Algebra, Convex Optimization, Statistical Decision Theory - Regression, Classification, Bias Variance, Linear Regression, Multivariate Regression, Subset Selection, Shrinkage Methods, Principal Component, Regression, Partial Least squares, Linear Classification, Logistic Regression, Linear Discriminant Analysis, Perceptron, Support Vector Machines	6
2	Neural Networks - Introduction, Early Models, Perceptron Learning, Back-propagation, Initialization, Training & Validation, Parameter Estimation - MLE, MAP, Bayesian Estimation, Decision Trees, Regression Trees, Stopping Criterion & Pruning loss functions, Categorical Attributes, Multi-way, Splits, Missing Values, Decision Trees - Instability Evaluation Measures	6
3	Bootstrapping & Cross Validation, Class Evaluation Measures, ROC curve, MDL, Ensemble Methods - Bagging, Committee Machines and Stacking, Boosting, Gradient Boosting, Random Forests, Multi-class Classification, Naive Bayes, Bayesian Networks	6
4	Undirected Graphical Models, HMM, Variable Elimination, Belief Propagation, Partition Clustering, Hierarchical Clustering, Birch Algorithm, CURE Algorithm, Density-based Clustering	6
5	Gaussian Mixture Models, Expectation Maximization, Learning Theory, Introduction to Reinforcement Learning, Optional videos (RL framework, TD learning, Solution Methods, Applications)	6

Text Books

- 1 Ethem Alpaydin, Introduction to Machine Learning, PHI, Third Edition, ISBN No. 978-81-203- 5078-6.
- 2 Shaishalev-Shwartz and Shai Ben-David, Understanding Machine Learning(From Theory to Algorithms), Cambridge University Press, First Edition, ISBN No. 978-1-107-51282-5.

Reference Books

- 1 Christopher M. Bishop, Pattern Recognition and Machine Learning, McGraw-Hill, ISBN No. 0-07-115467-1 .
- 2 Tom Mitchell, Machine Learning, McGraw-Hill, First Edition, ISBN No. 0-07-115467-1.
- 3 Ian Goodfellow and Yoshua Bengio, Deep Learning (Adaptive Computation and machine Learning Series), Massachusetts London, England, ISBN No. 9780262035613.

E Books/ Online learning material

- 1 <https://nptel.ac.in/courses/106/106/106106139/>

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	2											1	1	
CO 2	1	2											1	1	
CO 3	1	2	3										1	1	
CO 4	1	2	3		2							1		1	1
CO 5	1	2	3							1	1				

Assessment Table:

Assessment Tool	Course Outcomes				
	CO1	CO2	CO3	CO4	CO5
Evaluation I (Class Test) 20 Marks	5	5	5		5
Teachers Assessment 20 Marks					
ESE Assessment 60 Marks	12	12	12	6	18

Teaching Strategies:

1. Utilizing technology in the classroom.
2. Co-operative learning
3. Questioning to check for understanding
4. Plenty of practice
5. Be flexible about how long it takes to learn
6. Get students working together.

Teachers' Assessment:

Teachers' assessment will be based on one or many of the following

1. Multiple choice questions
2. Assignments
3. Power Point Presentation on allotted topics
4. Quiz
5. Surprise test
6. Interview / Viva

Assessment Pattern:

Level No.	Knowledge Level	Evaluation-I	Teachers Assessment	End Semester Examination
K1	Remember	5		12
K2	Understand	5		18
K3	Apply			12
K4	Analyze	5		6
K5	Evaluate	5		
K6	Create			12
Total		20		60

Course Code- **MC2110**Course Title- **Lab: Adv. Java**

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA / TW	ESE	Total
-	-	4	2	-	50	25	75

Course Objectives

- 1 Design and develop Web applications
- 2 Design and develop GUI applications using Abstract Windowing Toolkit (AWT), Swing and Event Handling.
- 3 Develop web application using Java Servlet and Java Server Pages technology.

Course Outcomes- After studying this course, students will be able

- CO 1 Develop and use Eclipse to create new project
- CO 2 Develop Database & its related Operations using Servlet.
- CO 3 Convert their project to layered MVC Architecture
- CO 4 Implement the advanced environment using Hibernate, Struct, Spring in their Application
- CO 5 Create dynamic web pages, using Servlets and JSP.

Course Contents (Suggestive List of Experiments)

Expt No	Title
1	Write a program for creating mini chat application using socket programming.
2	Write a program for Addition and Subtraction using concept of RMI programming
3	Write a program to implement CRUD operation in JDBC
4	Create Exam Registration Form using JDBC Connectivity
5	WRITE A PROGRAM for creating Edit menu for Notepad using Frame
6	WAP for creating simple servlet with JDBC.
7	Create Employee information Form using JSP
8	Write a program for implementing concept of MVC Architecture.
9	Write a program for implementing concept of Hibernate, Struct, Spring
10	Write a program for implementing concept of Maven Project
11	Write a program for implementing concept of Web Service
12	Write a program for implementing concept of Junit Testing.
13	Write a program for implementing concept of JAXB

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1											1	1	
CO 2	1														1
CO 3	1	1	2										1		
CO 4		1	2		2						1		1	1	
CO 5	1	2							1	1					1

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA / TW	ESE	Total
-	-	2	1	-	25	25	50

Course Objectives

- 1 To install the ASP .Net framework and get familiar to it.
- 2 To develop small programs for using controls
- 3 To understand how to create and use web services through ASP.NET

Course Outcomes- After studying this course, students will be able to

- CO 1 Understand HTML and CSS for ASP.NET
- CO 2 Remember Web pages using master pages and various control
- CO 3 Understand Database using ASP.NET & SQL Server
- CO 4 Understand web services using AJAX
- CO 5 Work individually and in a team effectively

Course Contents (Suggestive List of Experiments)**List of Experiments:**

- 1 To Study the ASP.Net Framework
- 2 To Study &Create Presentation Layer using HTML & CSS
- 3 To Study &Create Master Page, User Control etc
- 4 To Study& Use Standard Controls in ASP.NET
- 5 To Study& Use Validation Controls in ASP.NET
- 6 To Study, Create and Connect with Database using ASP.NET & SQL Server
- 7 To Study & Implement Web Services
- 8 To Study &Implement AJAX in ASP.NET
- 9 To Study & Deploy Project on IIS
- 10 Mini Project

Term work shall consist of record of minimum eight experiments based on performance, software modeling and study from the above list.

Mapping of COs and POs

PO → CO ↓	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO 3
CO 1	1	1													1
CO 2	2														1
CO 3	2	1	1											1	
CO 4		1			2							1			1
CO 5	1	2	1						1	1				1	1

Course Code- MC2112

Course Title- Lab: Cloud Computing

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA / TW	ESE	Total
-	-	2	1	-	25	25	50

Course Objectives

- 1 To install cloud computing environments
 - 2 To develop any one type of cloud
 - 3 To explore future trends of cloud computing

Course Outcomes- After studying this course, students will be able

- CO 1 Understanding of Cloud Computing for and the skillset needed to be a Cloud.
 - CO 2 Understanding different kinds of Cloud services IaaS, PaaS, SaaS.
 - CO 3 To Apply basic operations on different types of clouds.
 - CO 4 To handle data using clouds with different operations.
 - CO 5 Attempt to generate new ideas, innovations in cloud computing.

Course Contents (Suggestive List of Experiments)

Expt. No	Title
1	Introduction to cloud computing.
2	Installing ubuntu(Server Edition) using virtual box, and study virtualization.
3	Writing Sample applications on cloud using Google App Engine.
4	Implementation of SOAP web service in C#/JAVA application
5	Understanding Software as a service: SalesForce
6	Understanding private clouds: Openstack, Eucalyptus
7	Setting up using an instance on public Iaas Cloud, using Amazon AWS.
8	Exploring GitHub to learn features such as 1. How to create repositories 2.How to upload/download sourcecode 3. Making code commits 4. GitHub issues tracking features.
9	To study cloud security challenges.
10	To study various applications of cloud computing.

Mapping of COs and Pos

$PO \rightarrow CO \downarrow$	PO_1	PO_2	PO_3	PO_4	PO_5	PO_6	PO_7	PO_8	PO_9	PO_{10}	PO_{11}	PO_{12}	PSO_1	PSO_2	PSO_3
CO_1	1	1			1								1	1	
CO_2	2	1	1									1			
CO_3	2	1								1			1	1	
CO_4	2	1	1					1	1						1
CO_5	2				1			1			1				

Course Code- MC2113

Course Title- Minor Project

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA / TW	ESE	Total
-	-	4	2	-	50	25	75

Course Objectives

- 1 Design the problem solution as per the requirement analysis
- 2 Improve the team building, communication and management skills of the students
- 3 Build and test the mini project

Course Outcomes- After studying this course, students will be able

- CO 1 Demonstrate knowledge of the distinction between critical and noncritical systems.
- CO 2 Demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- CO 3 Demonstrate proficiency in rapid software development techniques.

Course Contents

- 1 The project batches of 2-3 students should be formed, which will work on the project allocated by the department. Term work submission should be done in the form of a joint report. The term work assessment will be done jointly by teachers appointed by Head of the Institution. The oral examination will be conducted by an internal and external examiner as appointed by the Institute.
- 2 Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
- 3 The mid-term evaluations should be done, which includes presentations and demos of the work done.
- 4 Project report should be of 35 to 40 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed.

5 Format of Project Report-

1. **Page Size:** Trimmed A4
2. **Top Margin:** 1.00 Inch
3. **Bottom Margin:** 1.32 Inches
4. **Left Margin:** 1.5 Inches
5. **Right Margin:** 1.0 Inch
6. **Para Text:** Times New Roman 12 Point Font
7. **Line Spacing:** 1.5 Lines
8. **Page Numbers:** Right Aligned at Footer. Font 12 Point. Times New Roman
9. **Headings:** Times New Roman, 14 Point Bold Face
10. **Certificate:** All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.

11. Index of Report:

- a. Title Sheet

- b. Certificate
- c. Acknowledgement
- d. Table of Contents
- e. List of Figures
- f. List of Tables

12. References: References should have the following format

For Books: "Title of Book", Authors, Publisher, Edition

For Papers: "Title of Paper", Authors, Journal/Conference Details, Year

**Useful
Links:**

- 1 <http://www.geeksforgeeks.org/>
- 2 <https://in.udacity.com/>
- 3 <https://graphics.stanford.edu/~seander/bithacks.html>
- 4 https://www.youtube.com/results?search_query=mycodeschool
- 5 <https://www.hackerrank.com/>

Course Code: MC2114

Course Title- Dissertation

Teaching Scheme				Examination Scheme			
Lectures	Tutorials	Practical	Credits	CT	TA / TW	ESE	Total
-	-	30	24	-	100	100	200

Course Objectives

- 1 Design the problem solution as per the requirement analysis
- 2 Improve the team building, communication and management skills of the students
- 3 Build and test the mini project

Course Outcomes- After studying this course, students will be able

- CO 1 Demonstrate knowledge of the distinction between critical and noncritical systems.
- CO 2 Demonstrate the ability to manage a project including planning, scheduling and risk assessment/management.
- CO 3 Demonstrate proficiency in rapid software development techniques.

Course Contents

- 1 The project work to be carried out individually which commences in the Semester IV as per the project assigned to the each individual by the respective industry. It shall include the problem definition, literature survey, approaches for handling the problem, finalizing the methodology for the project work and system design etc.
- 2 Term work submission should be done in the form of an individual report. Assessment of the term work will be done by the internal guide. The oral examination will be conducted by an internal and external examiner as appointed by the Institute.
- 3 Project work should be continually evaluated based on the contributions of the group members, originality of the work, innovations brought in, research and developmental efforts, depth and applicability, etc.
- 4 The mid-term evaluations should be done, which includes presentations and demos of the work done.
- 5 Project report should be of 35 to 40 pages (typed on A4 size sheets). For standardization of the project reports the following format should be strictly followed. **Format of Project Report-**
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 5. **Right Margin:** 1.0 Inch
 6. **Para Text:** Times New Roman 12 Point Font
 7. **Line Spacing:** 1.5 Lines
 8. **Page Numbers:** Right Aligned at Footer. Font 12 Point. Times New Roman

9. Headings: Times New Roman, 14 Point Bold Face

10. Certificate: All students should attach standard format of Certificate as described by the department. Certificate should be awarded to batch and not to individual student. Certificate should have signatures of Guide, Head of Department and Principal/ Director.

11. Index of Report:

- a. Title Sheet
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For Papers: "Title of Paper", Authors, Journal/Conference Details, Year

Useful Links:

- 1 <http://www.geeksforgeeks.org/>
- 2 <https://in.udacity.com/>
- 3 <https://graphics.stanford.edu/~seander/bithacks.html>
- 4 https://www.youtube.com/results?search_query=mycodeschool
- 5 <https://www.hackerrank.com/>