LOYOLA COLLEGE (AUTONOMOUS)
CHENNAI - 600 034.

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. Computer Science

P.G. PROGRAMME

SYLLABUS

Effective from the Academic Year 2012-2013

Loyola College (Autonomous)

Chennai- 600 034

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LOYOLA COLLEGE (AUTONOMOUS)
DEPARTMENT OF COMPUTER SCIENCE
MASTER OF SCIENCE in COMPUTER SCIENCE

(Effective from the Academic year 2012 -2013)

SEMESTER – III

Sl. No	Category	Title Of The Paper	Contact Hours	Credits
1	MC	Cloud Computing	4	3
2	MC	Open Source Technology	4	3
3	MC	Open Source Technology- Lab	4	3
4	MC	Wireless and Communication Networks	4	3
5	MC	Mini Project	4	3
6	ES	Artificial Intelligence / Distributed Computing	4	3
7	ID	Theory of Computation and Compiler Design	6	5
8	SS	Self study paper	Outside	2
		Total	30	26+2

SEMESTER – IV

Sl. No	Category	Title Of The Paper	Contact Hours	Credits
1	MC	Project Work and Viva-Voce	30	24

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Semester: III **Credits: 3**
Category: MC **No. of. Hours/Week: 4**

CLOUD COMPUTING

Objectives:

1. To gain knowledge in cloud computing technology.
2. To acquire the knowledge in various services and applications over the cloud

UNIT I
Cloud Computing Basics: Cloud Computing Overview- Applications – Intranets and the cloud – Why
Cloud Computing Matters – Benefits – Limitations – Companies in the Cloud Today – Cloud Services.

UNIT II
Cloud Computing Technology: Hardware and Infrastructure – Clients – Security- Network – Services – Accessing the Cloud - Platforms – Web Applications – Web APIs –Web Browsers –Cloud Storage – Overview – Cloud Storage Providers –Standards – Application – Client – Infrastructure – Service.

UNIT III
Cloud Computing at Work: Software as a service – Overview – Driving Forces – Company offerings – Industries – Software plus Services – Overview - Mobile Device Integration –Providers – Microsoft Online.

UNIT IV
Developing Applications: Google – Microsoft – Intuit Quick Base – Cast Iron Cloud – Bungee Connect - Local clouds and Thin Clients – Virtualization – Server Solutions – Thin Clients.

UNIT V
Migrating to the Cloud: Cloud Services for Individuals – Cloud services aimed at the mid-market –Enterprise-Class Cloud Offerings – Migration.

Text Book:
Velte T. Antony, Velte J. Toby., Elsenpeter Robert, “Cloud Computing: A Practical Approach”, ,2010,Tata McGraw- Hill

Reference Books:
1. Miller Michael, “Cloud Computing: Web-Based Applications That Change the Way You Work and Collaborate Online”, 2008,Que Publishing.
2. Beard Haley, “Cloud Computing Best Practices for Managing and Measuring Processes for On-demand Computing, Applications and Data Centers in the Cloud with SLAs”, 2008, Emereo Pvt. Limited

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Semester: III **Credits:3**
Category: MC **No.of.Hours/Week: 4**

OPEN SOURCE TECHNOLOGY

Objectives:

1. To understand the concepts of open source technology
2. To gain knowledge in Linux administration and developing application based on Linux.

UNIT I

Open Source Definition, The distribution terms of open source software, open source technology-importance-Free and Open Source Software (FOSS), LAMP (Linux, Apache, MySQL, PHP, Python, and Perl. Benefits, Perspectives of Open Source software-Linux and Open Source, Linux Usage Basics: Logging into the system, changing users and editing text file-.Running Commands and Getting Help- Browsing the File system, Users- Groups and Permissions.

UNIT II

Installation of Linux interactively-Perform user and group administration-Administer the Linux printing subsystem, Automate tasks with at, cron -Install, update, query and remove software packages with RPM

UNIT III

Accessing and Running Applications: cc compiler, gcc Compiler, Mozilla Firefox-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

Introduction to Web server. Installing Apache on Linux: http service-PHP : Testing Installation. Basics of PHP scripts, Variables, Data types, Operators and Expressions-Constants, Flow control functions , If statement, Loops, Arrays , Strings , Dates and Times , Forms.

UNIT V

MySQL : Configuring MySQL Server, working with MySQL Databases, MySQL Tables, SQL Commands – INSERT, SELECT, UPDATE, REPLACE, DELETE. Date and Time functions. PHP – MySQL Application Development : Connecting to MySQL with PHP, Inserting data with PHP,
Retrieving data with PHP. Developing PHP scripts for dynamic web page like Feedback form, online admission form, online test.

Text Books:

1. Negus Christopher “Red Hat Linux Bible”, 2004, Wiley Publishers.
2. Meloni C Julie “PHP, MySQL and Apache”, 2003,Pearson Education.

Reference Books:

1. N.B.Venkateshwarlu (Ed); Introduction to Linux: Installation and Programming, 2005, B S Publishers.
2. Nemeth, “Linux Administration Handbook”, 2nd edition, Pearson Education.
3. Vikram Vaswani “ How to do Everything with PHP & MySQL , 2005, McGraw Hill.

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Category: MC **No. of. Hours/Week: 4**

OPEN SOURCE TECHNOLOGY LAB

Objectives :

1. To gain practical experience in open source technology
2. Developing applications using the same.

1. Installation of WAMP/LAMP
2. Designing your own page using PHP
3. Create user using shell script with limited privileges
4. Changing file permissions using shell script
5. Scheduling a job using **cron**
6. Linux installation
7. Create a multimedia application using Linux
8. Create and edit a document using open office
9. Working with different types of looping statements using PHP
10. Working with different types of array using PHP
11. Working with PHP forms
12. Executing DML and DDL commands using MySQL
13. Retrieving data from table using PHP
14. Inserting data into table using PHP
15. Create a feedback form using PHP and MySQL
16. Create an application for ONLINE TEST using PHP and MySQL.

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Semester : III **Credits: 3**
Category: MC **No of Hours/week: 4**

WIRELESS AND COMMUNICATION NETWORKS

Objectives:

1. To obtain the knowledge about the Wireless network operations and technologies behind the mobile communication and its applications.
2. To understand different mobile technologies.

UNIT I

Principles of wireless networks, Network planning: Introduction - wireless network topologies - cellular topology - cell fundamentals - signal to interference calculation - capacity expansion techniques - network planning for CDMA systems -wireless network operations: Introduction - mobility management - radio resources and power management - security in wireless networks.

UNIT II

Wireless WANS **,**GSM & TDMA technology: Introduction – GSM - Mechanisms to support a mobile environment - communication in the infrastructure. CDMA technology -IS – 95 & IMT – 2000 :Introduction - reference architecture for North American systems – CDMA - IMT 2000.

UNIT III

Mobile data networks: Introduction - the data oriented CDPD networks - GPRS and higher data rates - short messaging service in GSM - Mobile application protocols. Local BROADBAND and AD HOC networks: Introduction to wireless LAN :Introduction - evolution of the WLAN industry.

UNIT IV

IEEE 802.11 WLANS : Introduction- IEEE 802.11 - The PHY LAYER - MAC Sublayer - MAC management sublayer - Wireless ATM – HIPHERLAN - HIPHERLAN-2 . Ad Hoc networking an WPAN: wireless ATM and HIPHERLAN - IEEE 802.15 WPAN - Home RF - Bluetooth.

UNIT V

Mobile IP : Goals – Assumptions and Requirement – Entities – IP packet Delivery- Agent Advertisement and Discovery – Registration – Tunneling and Encapsulation – Optimization – Reverse Tunneling – IPv6 – DHCP- Ad hoc Networks. Mobile Transport Layer:Traditional TCP- Indirect TCP- Snooping TCP- Mobile TCP- Fast retransmit/ Fast Recovery- Transmission/ Timeout Freezing – Selective Retransmission- Transaction Oriented TCP.-

Text Books:

1. Pahlavan Kaveh and Krishnamurthy Prashant, 2004, “Principles of wireless Networks”, Pearson education,
2. Schiller Jochen, “Mobile Communications”, Second Edition, Pearson Education

Reference Books:

1. Stallings William, “Wireless Communications and Networks”, 2003 ,Second Edition, PHI.
2. Hansmann Uwe, Merk Lothar, Nicklons S. Martin and Stober Thomas, “Principles of Mobile Computing”, Springer

Web Resources:

1. www.springer.com
2. www.brunel.ac.uk
3. www.sciencedirect.com

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Semester: III **Credits: 3**
Category: MC **No. of. Hours/Week: 4**

MINI PROJECT

Objectives:

1. To provide practical exposure in the software development through choosing a real world problem.
2. To develop an automated system and provide exposure in documentation of the system.

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Semester: III **Credits: 3**
Category: ES **No. of. Hours/Week: 4**

ARTIFICIAL INTELLIGENCE

Objectives:

1. To obtain knowledge in artificial intelligence as machine learning.
2. To obtain skills in perception, reasoning and learning.
3. To provide in-depth understanding of major techniques used to simulate intelligence.

UNIT I

Introduction: Intelligent Agents – Agents and environments - Good behavior – The nature of environments – structure of agents - Problem Solving - problem solving agents – example problems –searching for solutions – uniformed search strategies - avoiding repeated states – searching with partial information.

UNIT II

Searching Techniques: Informed search and exploration – Informed search strategies – heuristic function – local search algorithms and optimistic problems – local search in continuous spaces – online search agents and unknown environments - Constraint satisfaction problems (CSP) – Backtracking search and Local search for CSP – Structure of problems - Adversarial Search – Games – Optimal decisions in games – Alpha – Beta Pruning – imperfect real-time decision – games that include an element of chance.

UNIT III

Knowledge Representation: First order logic – representation revisited – Syntax and semantics for first order logic – Using first order logic – Knowledge engineering in first order logic - Inference in First order logic – prepositional versus first order logic – unification and lifting – forward chaining – backward chaining - Resolution - Knowledge representation - Ontological Engineering - Categories and objects – Actions - Simulation and events - Mental events and mental objects

UNIT IV

Learning: Learning from observations - forms of learning - Inductive learning - Learning decision trees - Ensemble learning - Knowledge in learning – Logical formulation of learning – Explanation based learning – Learning using relevant information – Inductive logic programming - Statistical learning methods - Learning with complete data - Learning with hidden variable - EM algorithm - Instance based learning - Neural networks - Reinforcement learning – Passive reinforcement learning - Active reinforcement learning - Generalization in reinforcement learning.

UNIT V

Applications: Communication – Communication as action – Formal grammar for a fragment of English – Syntactic analysis – Augmented grammars – Semantic interpretation – Ambiguity and disambiguation – Discourse understanding – Grammar induction - Probabilistic language processing - Probabilistic language models – Information retrieval – Information Extraction – Machine translation.

Text Book:

1. Russell Stuart, Norvig Peter, 2004,"Artificial Intelligence – A Modern Approach", 2nd Edition, Pearson Education.

Reference Books:

1. Rich Elaine , Knight Kevin, "Artificial Intelligence", 2003,2nd Edition, Tata McGraw-Hill,

2. Nilsson J.Nils, “Artificial Intelligence: A new Synthesis” ,2000, Harcourt Asia Pvt. Ltd.,
3. Luger F. George, “Artificial Intelligence-Structures and Strategies for Complex Problem Solving”,
2002,Pearson Education.

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Semester: III **Credits: 3**
Category: SE **No. Of. Hrs/Week: 4**

DISTRIBUTED COMPUTING

Objectives:

1. To develop skills and knowledge in Distributed objects,
2. Understand the concept of Distributed Computing, Distributed file system, Name services and Distributed transactions.

UNIT I

Characterization of Distributed Systems - Examples - Resource Sharing and the Web - System Models - Architectural and Fundamental Models - Networking and Internetworking - Types of Networks - Network Principles - Internet Protocols - Case Studies.

UNIT II

Inter process Communication - The API for the Internet Protocols - External Data Representation and Marshalling - Client-Server Communication - Group Communication - Distributed Objects and Remote Invocation - Communication Between Distributed Objects - Remote Procedure Call - Events and Notifications.

UNIT III

Protection - Processes and Threads - Communication and Invocation – OS Architecture - Security - Overview - Cryptographic Algorithms - Digital Signatures - Cryptography Pragmatics - Case Studies - Distributed File Systems - File Service Architecture .

UNIT IV

Name Services -Domain Name System - Directory and Discovery Services - Global Name Service - Clocks, Events and Process States - Synchronizing Physical Clocks - Logical Time And Logical Clocks - Global States.

UNIT V

Transactions - Nested Transactions - Locks - Optimistic Concurrency Control - Timestamp Ordering - Comparison - Flat and Nested Distributed Transactions - Atomic Commit Protocols - Concurrency Control in Distributed Transactions - Distributed Deadlocks - Transaction .

Text Book:

1. Coulouris George, Dollimore Jean and Kindberg Tim, “Distributed Systems Concepts and Design”, 4th Edition, 2012, Pearson Education, Delhi.

Reference Books :

1 Attiya Hagit, Welch Jennifer,” Distributed Computing”, 2004, Willey India Edition, Delhi.
2. M.L. Liu, “Distributed Computing Principles and Applications”, 2004, Pearson Education, Delhi.
3. Tanenbaum S Andrew , Van Steen Maarten, “ Distributed Systems –Principles and Pardigms”, 2007,Pearson Education, Delhi.

Web resources : http://distributedcomputing.info/
http://fieldtrip.fcdonders.nl/tutorial/distributedcomputing

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Semester: III **Credits: 3**
Category: ES **No. of .Hours/Week: 4**

CELLULAR MOBILE COMPUTING

Objectives:

1. To gain knowledge in cellular technology with various transmission techniques.
2. To understand the communication techniques under mobile computing.

UNIT I

Introduction to wireless mobile communications: History and evolution of mobile radio systems – types of mobile wireless services – cellular, WLL , paging, Satellite systems- Standards -Future trends in personal wireless systems.

UNIT II

Cellular concepts and system design fundamentals: Cellular concept and frequency reuse – Multiple access schemes- Channel assignment and handoff- Interference and system capacity- Trunking and Erlang capacity calculations

UNIT III

Mobile radio propagation: Radio wave propagation issues in personal wireless systems – Propagation
models - Multipath fading and based and impulse response models – Parameters of mobile multipath channels - Antenna systems in mobile radio.

UNIT IV

Modulation and signal processing: Analog and digital modulation techniques - performance of various modulation techniques – Spectral efficiency – error rate - power amplification – equalization / Rake receiver concepts - Diversity and space-time processing - speech coding and channel coding.

UNIT V

System examples and design issues: Multiple Access techniques – FDMA, TDMA and CDMA systems Operational systems - Wireless networking - Design issues in personal wireless systems.

Text Book :

K. Feher, 2000,"Wireless Digital Communications", PHI, New Delhi,

Reference Books:

1. T.S. Rappaport ,"Wireless Communications - Principles and Practice", 1996, PHI
2. W.C.Y. Lee, "Mobile Communications Engineering – Theory and Applications", 2nd Edition,1998, McGraw Hill International.

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Semester: III **Credits: 5**
Category: ID **No. of hrs/week: 6**

THEORY OF COMPUTATION AND COMPILER DESIGN

Objectives:

1. To understand the fundamentals in theory of computation and in automata theory.
2. To give an overall view of the different phases of compilation and its purpose.

UNIT I

Introduction to the theory of computation – set theory – definition of sets – properties – functions – primitive recursive and partial recursive functions – Formal representation of languages – Chomsky classification.

UNIT II

Introduction to automata theory – Definition of automation – finite automata – Transition diagrams – Nondeterministic and deterministic finite automation – Conversion of NFA to € -Regular expressions – Pumping lemma for Regular Language.

UNIT III

Turing Machine – Formal definition – Language acceptability –Universal Turing machines – Halting problem of Turing Machine.
Compilers – Analysis of the source program – Grouping of Phases – Compiler construction tools.

UNIT IV

Phases of Compilation - Lexical Analysis, Regular grammar and regular expression. Context free grammar – Top down parsing – Bottom up parsing – LR and LALR parsing.

UNIT V

Code optimization – scope – local optimization – loop optimization – frequency reduction, folding, DAG representation.

Text books:

1. J.P.Tremblay, R.Manohar, Discrete Mathematical Structures with Applications to Computer Science, TataMcGraw Hill.
2. Aho V Alfred, Lam S. Monica, Sethi Ravi and Ullman D. Jeffrey, Compilers: Principles, Techniques, and Tools, Second Edition, Pearson Education,.

Reference Books:

1. K.Anuradha, Y.Vijayalakshmi, Formal Languages and Automata Theory, 2013, CBS Publishers.
2. Hopcroft E. John, Motwani Rajeev, Ullmann G Jeffrey, Introduction to Automata Theory, Languages , and Computation, Third edition ,2008, Pearson Education.