

DEPARTMENT OF COMPUTER SCIENCE

M.Sc. - COMPUTER SCIENCE

SYLLABUS

Effective from the Academic Year 2016-2017



LOYOLA COLLEGE (Autonomous)

Ranked 2 in INDIA RANKING 2017 - NIRF

'College of Excellence' Status Conferred by UGC in 2014

Re-accredited with 'A' Grade (3.70 CGPA) by NAAC in 2013

Chennai - 600 034

RESTRUCTURING-2016 (2016-17 batch ONWARDS) PG - Arts / Science / Commerce / Social Work

Part	Semester 1	Semester 2	Summer Vacation	Summer 3	Summer 4	Total Hours
Major Core (MC)	30(20 C)	24(20 C)	--	20(15 C)	30(24 C)	104(79 C)
Elective Subject (ES)	--	4(3 C)	--	4(3 C)	--	8(6 C)
Inter - Disciplinary (ID)	--	--	--	6(5 C)	--	6(5 C)
Self study Paper (SSP)				Outside class hours(2C)		(2 C)
Summer Training Program (STP)	--	--	3 to 4 weeks (1 C)	--	--	(1 C)
Life Skills Training (LST)	--	2h + 2h# (2 C)	--	--	--	2+2# (2 C)
Extension Activities	LEAP	LEAP(3 C)	--	--	--	(3 C)
Total Hours (Total Credits)	30 (20 C)	30+2# (23+5 C)	--(1 C)	30 (23+2 C)	30 (24 C)	120+2# (90+6+2*)C

Note: A theory paper shall have 5 to 6 contact hours and a practical session shall have 3 to 5 contact hours.

New format of the subject codes from the 2016 regulation

Subject codes are 10 characters long:

1 st	2 nd	3 rd	4 th	5 th	6 th	7 th	8 th	9 th	10 th
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- 1st & 2nd digits – last two digits of regulation year in YY format (If 2016, it will be 16).
- 3rd alphabet: U – UG / P – PG / M – M.Phil. / D – Ph.D.
- 4th & 5th alphabets: department wise program code (example – MT / CO / HT.....)
- 6th digit: Semester for UG/ PG / M.Phil. and year for Ph.D.
- 7th & 8th alphabet: Category of paper or group of category of papers (GE/RL/OL/HE/OR/AL /ES/SK/MS/CM/CC/)
- 8th & 9th digits: subject number range (01 to 99).

For example,

Example 1: 16UCH1MC01

16 – Admitted in 2016

U – UG student

CH – Chemistry Student

1 – 1st Semester subject

MC01 – Major paper

Example 2: 16PCO2ID01

16 – Admitted in 2016

P – PG student

CO – Commerce Student

2 – 2nd Semester subject

ID01 – Inter disciplinary paper

- For subjects which are carried forward from one regulation to the next, the first two digits representing the regulation alone will change.
- Subjects which are not carried forward from one regulation to the next, will not appear in the new regulation.
- For new subjects which need to be added to a regulation, a new subject code must be created in continuation of the last created code under that type/category.
- Subject codes which are identical (except for the first two digits which represent the regulation year) are treated as equivalent for the purpose of syllabus / question paper setting / conducting examination / etc.

DEPARTMENT OF
MASTER OF SCIENCE IN COMPUTER SCIENCE

Sl. No.	Sub.Code.	Title
1	16PCS1MC01	DATA MINING
2	16PCS1MC02	DATA MINING USING R - LAB
3	16PCS1MC03	ADVANCED JAVA PROGRAMMING
4	16PCS1MC04	ADVANCED JAVA PROGRAMMING - LAB
5	16PCS1MC05	ADVANCED COMPUTER NETWORKS
6	16PCS1MC06	OBJECT ORIENTED SOFTWARE ENGINEERING
7	16PCS2MC01	DESIGN AND ANALYSIS OF ALGORITHMS
8	16PCS2MC02	ALGORITHM IMPLEMENTATION THROUGH PYTHON- LAB
9	16PCS2MC03	WEB PROGRAMMING USING ASP.NET AND C #
10	16PCS2MC04	WEB PROGRAMMING USING ASP.NET AND C # - LAB
11	16PCS2MC05	ADVANCED DATABASE MANAGEMENT SYSTEMS
12	16PCS2ES01	SOFT COMPUTING
13	16PCS2ES02	NEURAL NETWORKS
14	16PHE2FC01	LIFE SKILLS TRAINING

15	16PCS3MC01	BIG DATA ANALYTICS
16	16PCS3MC02	DIGITAL IMAGE PROCESSING
17	16PCS3MC03	DIGITAL IMAGE PROCESSING- LAB
18	16PCS3MC04	CRYPTOGRAPHY AND CYBER SECURITY
19	16PCS3PJ01	MINI PROJECT
20	16PCS3ES01	ARTIFICIAL INTELLIGENCE
21	16PCS3ES02	CLOUD COMPUTING
22	16PCS3ES03	MOBILE COMPUTING
23	16PCS3ES04	INTERNET OF THINGS
24	16PCS3TP01	SUMMER TRAINING PROGRAMME
25	16PCS3ID01	THEORY OF COMPUTATION AND COMPILER DESIGN
26	16PCS4PJ01	MAJOR PROJECT

16PCS1MC01 DATA MINING

SEMESTER	I	CREDITS	4
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To develop the abilities of critical analysis to data mining systems and applications.
2. To implement practical and theoretical understanding of the technologies for data mining.
3. To understand the strengths and limitations of various data mining models.

UNIT I 15Hrs Introduction:

Data Mining - R – Datasets. Data Import and Export: Save and Load R Data – Import from and Export to .csv Files – Import Data from SAS – Import/Export via ODBC. Data Exploration: Explore Individual variable – Explore Multiple variables – More Explorations – Save charts into Files.

UNIT II 15Hrs Decision Trees and Random Forest:

Decision Trees with Package party – Decision Trees with Package part – Random Forest. Regression: Linear Regression – Logistic Regression – Generalized Linear Regression – Non-Linear Regression.

UNIT III 15Hrs Clustering:

K-Means Clustering – K-Medoids Clustering – Hierarchical Clustering – Density based Clustering – Outlier Detection: Univariate Outlier Detection – Outlier Detection with LOP – Outlier Detection by Clustering – Outlier Detection from Time series.

UNIT IV 15Hrs

Time Series Analysis and Mining: Time Series Data in R – Time Series Decomposition – Time Series Forecasting – Time Series Clustering – Time Series Classification.

UNIT V 15Hrs Association Rules:

Basics of Association Rules – Association Rule Mining – Removing Redundancy – Interpreting Rules – Visualizing Association Rules.

TEXT BOOKS

1. Yanchang Zhao, “R and Data Mining – Examples and case studies”, Academic Press, Elsevier Publications, First Edition 2013.
2. Paul Teetor, “R Cookbook” O’Reilly Publications, First Edition, 2011.

REFERENCE BOOKS

1. PawetCichosz, “Data mining Algorithms explained using R”, Wiley Publications, First Edition, 2015.
2. Mark Gardner, “Beginning R – The Statistical Programming Language”, John Wiley and Sons, First Edition, 2012
3. Margaret H. Dunham, “Data Mining Introductory and Advanced Topics”, Pearson publications, Ninth Impression, 2006
4. Jiawei Han, MichelineKamber, Jian Pei “ Data Mining Concepts and Techniques”, Morgan Kaufmann Publishers, Third Edition, 2011.

16PCS1MC02DATA MINING – LAB

SEMESTER I CREDITS 3

CATEGORY MC(T) NO.OF HOURS/ WEEK 5

Objectives:

1. To acquire the knowledge of Data Handling.
2. To implement practical and theoretical understanding of data mining.
3. To understand the strengths and limitations of various data mining models.

Exercises

1. Importing and Exporting Data in R.
2. Function Handling in R
3. Data Handling with R.
4. Model Building with Decision Trees.
5. Model Building with Random Forest.
6. Predictive Model Building with Regression.
7. Cluster Analysis Using K Means and K Medoids.
8. Outlier Detection with LOP.
9. Outlier Detection by Clustering.
10. Outlier Detection from Time Series.
11. Clustering with Euclidian Distance.
12. Classification with Extracted Features.
13. Classification with K-NN Classification.
14. Finding Frequent Item Set with Apriori Algorithm.
15. Finding Frequent Item Set with FP-Growth Algorithm.

16PCS1MC03 ADVANCED JAVA PROGRAMMING

SEMESTER	I	CREDITS	4
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To understand the concept of Java programming.
2. To understand the advanced concept of internet programming.
3. To acquire the knowledge for developing web based application using Java programming

UNIT I 15Hrs Fundamentals of java:

Introduction to java- Features of java- basic fundamentals- Access controls-Static and fixed methods-Inner classes-String

class-Inheritance-Overriding methods- Using Super- Abstract classes-Packages-Interfaces-Exception Handling-Threads.

UNIT II 15Hrs

Applet and Swing :Applets-Events-Drawing Images-graphics using applets-Swing Components- Lists- Tress- Tables –Styled Text Components-Progress Indicators- Component Organizers

UNIT III 15Hrs

JDBC and Java networking: Database Drivers-SQL package-Networking in java-Sockets- Creating RMI server – Client – Interface - Networking using RMI-JDBC.

UNIT IV 15Hrs

Servlet and JSP programming: Servlet API-Servlet Life cycle-Html to Servlet Communication- Introduction to JSP-JSP tags-Sessions.

UNIT V15Hrs Enterprise java Beans (EJB): Introduction to EJB-Deployment Descriptors-Session java Bean- Entity java bean-Message-Driven Beans.

TEXT BOOKS:

1. Herbert Schildt, “Java 2 Complete Reference”, Tata McGraw Hill, Ninth Edition, 2014. (UNIT-I,II,III)
2. Kathy Sierra & Bert Bates,“Head First Servlets &JSP”, O’REILLY Publications, 2008. (UNIT-IV)
3. S. Padmapriya, “Advanced Java Programming”, Sree Magnus Publications, 2010(UNIT-V)

REFERENCE BOOKS:

1. Jim Keogh, “J2EE Complete Reference” Tata Mcraw Hill, 2012.
2. Kathy Sierra & Bert Bates, ”Head First EJB”, O’REILLY publications, 2013.

16PCS1MC04 ADVANCED JAVA PROGRAMMING-LAB

SEMESTER	I	CREDITS	3
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To implement the concept of Java programming.
2. To implement the advanced concept of internet programming in real time systems.
3. To develop the web based application using java programming

Exercises

1. Write a Java Program using classes and objects.
2. Write a Java Program with method over loading.
3. Write a Java program to handle strings.
4. Write a Java Program with Abstract classes.
5. Write a Java Program with Interfaces.
6. Create and import a package in Java.
7. Write a Java Program to handle Built-in and user defined Exceptions.
8. Write an Applet program that create two buttons named “Red” and “Blue” change the background colour of the applets according to the selection of the button.
9. Write a Java Applet that creates some text fields and text areas to demonstrate features of each.
10. Write a Program to create a List Box and a Text Area. Fill up the List Box with some file names. When user double clicks on any filename of the list box, the file should be opened and its contents should be displayed in the text Area.
11. Develop a suitable GUI using SWING.
12. Write Java program to perform database connectivity.
13. Write a Java program to establish network connectivity
14. Write a Servlet program to display your profile in the webpage.
15. Write a Servlet program to manipulate (Insert, Delete, Update & Search) the database through HTML form.

16. Write a JSP program to create college application form.
17. Write a Java program to perform remote method invocation.
18. Create a simple application using EJB.

16PCS1MC05 ADVANCED COMPUTER NETWORKS

SEMESTER	I	CREDITS	3
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To acquire knowledge about the network designing concepts.
2. To understand the functionalities of different layers.
3. To give an introduction of wireless ad-hoc communication technologies.

UNIT I 14 Hrs:

Introduction - Computer Networks -Network hardware – Network software – Protocol Hierarchies – Design Issues for the layers – Connection oriented and connectionless services – Service primitives- Reference Models – The OSI Reference Model – TCP/IP Reference Model - Network standardization.

UNIT II 14 Hrs :

Guided transmission media – Twisted Pair - Coaxial cable – Fiber Optics – Wireless transmission – Radio transmission – Microwave transmission – Infrared – Light wave transmission – Communication Satellites – Data link layer design issues – Error detection and correction – Error correcting codes – Error detecting codes.

UNIT III 16 Hrs :

Network Layer Design issues – Comparison of virtual circuit and datagram subnets- Routing algorithms – Shortest Path routing – Flooding – Distance vector routing – Link state routing – Hierarchical routing – Congestion control algorithms – General principles of congestion control – Congestion control in virtual-circuit subnets and datagram subnets – Internetworking – Concatenated virtual circuits – connectionless Internetworking.

UNIT IV 14 Hrs :

Transport Layer – Elements of Transport Protocols – Addressing – Connection establishment – connection release – flow control and buffering – Multiplexing – Crash recovery. Internet transport protocols – Introduction to UDP – TCP Segment header – TCP Connection establishment – TCP Connection Release.

UNIT V 14 Hrs:

Wireless AdHoc Communication Technologies – WLANs – Wireless LAN Services – WLAN Network configurations – Physical Media for WLANs – Technologies for Adhoc Networks – IEEE 802.11 protocol specifications – Bluetooth Network configuration – Bluetooth protocol stack – Bluetooth topologies.

TEXT BOOKS

1. Andrew S.Tanenbaum, “Computer Networks”, Pearson Education, Fourth Edition, 2003.
2. George Aggelou, “Mobile Ad hoc Networks – From Wireless LANs to 4G Networks”, Tata McGraw Hill, 2009.

REFERENCE BOOKS

1. BehrouzForouzan, “Data communications and Networking” , Tata McGraw Hill, Fourth Edition, 2007.
2. William Stallings, “Data Computer Communications”, Seventh Edition, Pearson Education, 2004.

16PCS1MC06 OBJECT ORIENTED SOFTWARE ENGINEERING

SEMESTER	I	CREDITS	3
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To understand the fundamentals of software engineering.
2. To apply the concepts of OOAD in software engineering.
3. To express the flow of any Software Project.

UNIT I 12Hrs Introduction:

What is Object-oriented?- What is Object-oriented development?- Object-oriented themes; Object modeling; Object-oriented methodologies: Introduction –Three methodologies- The Unified approach - UML.

UNIT II 12 Hrs:

Object-oriented analysis process: Use-case model; Object analysis: Approaches for identifying classes –Three different approaches- Classes, responsibilities and collaborators-Naming classes; Identifying Object relationships, Attributes, and Methods - Case studies.

UNIT III 12 Hrs

The Object-oriented design process and design axioms; Designing classes; Access layer: Object-oriented database management systems- Object-relational systems- Designing access layer classes - Case studies.

UNIT IV 12 Hrs

View layer: User interface design - View layer classes - Micro level processes - View layer interface - Case studies; Programming style: Object-oriented style-Reusability-Extensibility- Robustness-Programming-in-the-Large.

UNIT V 12 Hrs

Object orientation on testing - Test cases - Test plans - Continuous testing - Debugging principles - System usability and measuring user satisfaction - Case studies; Managing Object- oriented software engineering: Project selection and preparation- Project organization and management-Software quality assurance, Software metrics.

TEXT BOOKS:

1. Ali Bahrami -Object-Oriented Systems Development, McGraw-Hill International Edition-1999.(All Units)
2. James Rumbaugh et al, Object-oriented Modeling and Design, Prentice-Hall of India, 2001 (UNIT I and UNIT IV)

- Ivar Jacobson, Object oriented Software Engineering, Addison -Wesley, '94 (V Unit)

REFERENCE BOOKS:

- Booch, Grady, Jacobson, Rumbaugh,“ The Unified Modeling Language User Guide”, Addison-Wesley, Pearson Education
- Patrick W. Sheridan, Jean M. Sekula,” Interactive UML Development using V.B.6”,.BPB Publication
- Martin Fowler, UML Distilled, Addison-Wesley, Edition III, 2004
- Roger S. Pressman, S/W Engineering- A Practitioner’s Approach, sixth edition, McGraw- Hill International

16PCS2MC01 DESIGN AND ANALYSIS OF ALGORITHMS

SEMESTER	II	CREDITS	4
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

- To provides different programming paradigms for solving problems.
- To introduce the classic algorithms in various domains of data structures.
- To apply this techniques to the real time problems.

UNIT I 15Hrs

Fundamentals of algorithmic problem solving – Important problem types– Fundamentals of the analysis of algorithm efficiency– analysis frame work– Asymptotic notations – Mathematical analysis for recursive and non-recursive algorithms– Example Fibonacci Numbers

UNIT II 15Hrs

Divide and conquer methodology – Merge sort – Quick sort – Binary search – Binary tree traversal – Multiplication of large integers –

Strassen's matrix multiplication – Greedy method – Prim's algorithm – Kruskal's algorithm – Dijkstra's algorithm.

UNIT III 15Hrs

Decrease And Conquer Method: Selection sort, Bubble sort, Sequential search, Insertion sort, Depth-First Search and Breadth-First search. Dynamic Programming : Computing a binomial coefficient – Warshall's and Floyd' algorithm – Optimal binary search tree – Knapsack problem – Memory functions.

UNIT IV 15Hrs

Backtracking – N-Queens problem – Hamiltonian circuit problem – Subset sum problem – Branch and bound– Assignment problem – Knapsack problem – Traveling salesman problem.

UNIT V 15Hrs

P & NP problems– NP-complete problems– Approximation algorithms for NP-hard problems– Traveling salesman problem– Knapsack problem.

TEXT BOOK:

1. Anany Levitin, "Introduction to the Design and Analysis of Algorithms", Pearson Education, 2013.

REFERENCE BOOKS:

2. ThomasH.Cormen, Charles E. Leiserson, Ronald L. Rivest, "Introduction to algorithms", Prentice Hall 2009.
3. A.A.Puntambekar, "Design and Analysis of Algorithms", Technical Publications, 2012.

16PCS2MC02 ALGORITHM IMPLEMENTATION THROUGH PYTHON- LAB

SEMESTER	II	CREDITS	4
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To introduce the python programming techniques
2. To apply python programming techniques to implement the data structures.
3. To provide different programming paradigms for solving problems.

Exercises:

1. Looping Structure
2. Arrays concepts - Ascending& Descending Order
3. Euclid's method
4. Consecutive Integer Checking
5. Binary Search
6. Sequential Search
7. Merge Sort
8. Quick Sort
9. Binary Tree Traversal
10. Strassen's Matrix Multiplication
11. Prim's Algorithm-Greedy Method
12. Kruskals Algorithm-Greedy Technique
13. Binomial Coefficient-Dynamic Programming
14. Warshall's algorithm- Dynamic Programming
15. Floyd's Algorithm-Dynamic Programming
16. Optimal Binary Search Tree- Dynamic Programming
17. Knapsack problem
18. Dijkstra's Algorithm

16PCS2MC03 WEB PROGRAMMING

USING ASP.NET AND C#

SEMESTER	II	CREDITS	4
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To study the basics of .Net Framework, ASP.Net web form controls, ADO.Net.
2. To develop console applications using C#.
3. To develop web applications using the above tools.

UNIT I 15Hrs:

Introducing .NET, .NET Framework-Common Language Runtime, .Net Class Library, C# Language- basics, variables and data types, Variable Operations, Conditional logic, Loops, Methods, Building a Basic Class, Value types and reference types, understanding Namespaces and Assemblies.

UNIT II 15Hrs :

Anatomy of a Web Form, Writing Code, Debugging, Anatomy of an ASP.NET Application, server controls, HTML control Classes, Page Class, Application Events, Web Control Classes, List controls, Table controls, Web Control Events and Auto Post back.

UNIT III 15Hrs:

Exception Handling, Page Tracing, State Management-View state, Transferring information between Pages ,Cookies, Session State, Session State Configuration, Application state, Validation-Understanding validation, Validation controls, Rich Controls-Calendar, Ad Rotator and Pages with multiple views, User controls.

UNIT IV 15Hrs :

ADO.NET-Data Provider model, Direct Access model, Disconnected Data Access model, Data Binding-Single value data binding, Repeated value data binding, Data Controls- Grid View, Formatting, Grid View – Selecting, editing, Sorting and Paging, Files and

streams-File system information, Reading and writing with streams, Allowing file uploads.

UNIT V 15Hrs :

XML– XML classes, Website Security- Authentication and Authorization, Forms Authentication, Windows Authentication ,Creating a Component, Properties and state, Data access component, Object data source, Caching- Output Caching, Data Caching, Caching with dependencies.

TEXT BOOK:

1. Matthew MacDonald, “Beginning ASP.NET 4 in C# 2010”, APRESS, 2010.

REFERENCE BOOKS:

1. Matthew MacDonald, “Pro ASP.NET 4 in C# 2010”, APRESS , 2010.
2. BillEvjen, Scott Hanselman “Professional ASP.NET 3.5 in C# and VB”, Wrox Publication, 2011.
3. ImarSpaanjaars, “Beginning ASP.NET 4 in C# and VB”, Wrox Publications, 2010.
- 4.

16PCS2MC04 WEB PROGRAMMING USING ASP

.NET AND C# - LAB

SEMESTER II CREDITS 4

CATEGORY MC(T) NO.OF HOURS/ WEEK 5

Objectives:

1. To develop console applications using C#.
2. To develop web applications usingASP.Net web form controls.
3. To develop web applications using ADO.Net.

Exercises:

Console Applications

1. Arrays Implementation
2. Method in C#

3. Static method
4. Constructors and its type
5. Reference type
6. Namespace

Web Applications:

1. Simple calculator design using ASP control
2. Fetch data from database using connected architecture
3. Fetch data from database using disconnected architecture
4. Login page in ASP.Net
5. Quiz creation
6. Page design using calendar control
7. Validate user input using validation controls.
8. Develop a Database application using ADO.NET to insert, modify, update and delete operations.
9. Table view using Data Grid control
10. Edit and Delete record from Grid control
11. Fetch data from XML file
12. Ticket reservation using ASP.NET controls

16PCS2MC05 ADVANCED DATABASE

MANAGEMENT SYSTEM

SEMESTER II CREDITS 4

CATEGORY MC(T) NO.OF HOURS/ WEEK 4

Objectives:

1. To understand the modeling and design of databases.
2. To acquire knowledge on Relational languages and database design.
3. To gain knowledge about transactions in databases.

UNIT I 12 Hrs

Data models, Schemas and Instances – Three Schema architecture and Data Independence – Database Languages and Interfaces –

Database System Environment – Relational Model concepts – Relational Model constraints and Relational database schemas.

UNIT II 12 Hrs

Formal Relational Languages – Unary Relational operations: select and project – Relational Algebra Operations from set theory – Binary relational operations – Join and Division – Additional relational operations – Tuple Relational calculus – Domain Relational calculus.

UNIT III 12Hrs

Conceptual data modeling using entities and relationships – Entity types, sets, attributes and keys – Relationship types, Relationship sets, Roles and structural constraints – Specialization and Generalization in EER- Mapping EER model constructs to Relations.

UNIT IV 12Hrs

Database design – Functional dependencies – Normal forms based on primary keys – First, Second and Third Normal form – BCNF – Multi valued dependency and Fourth Normal Form – Join dependencies and Fifth Normal Form. Database File Indexing techniques – Types of single level ordered indexes – Multilevel indexes – Dynamic multilevel indexes using B-Trees and B+- Trees.

UNIT V 12 Hrs

Query Processing – Translating SQL queries into Relational Algebra - Using Heuristics in Query Optimization – Semantic Query optimization – Transaction and System concepts –Desirable properties of transactions – Characterising schedules based on recoverability – Characterising schedules based on serializability.

TEXT BOOKS

1. Ramez Elmasri, Shamkant B Navathe, “ Database systems – Models, Languages, Design and Application Programming “, Pearson, Sixth Edition, 2011

REFERENCE BOOKS

1. C.J. Date,A. Kannan, S. Swamynathan, “An Introduction to Database Systems”, Pearson Education, Eighth edition, 2009

2. Abraham Silberschatz, Henry F Korth, S. Sudharshan, “ Database System Concepts”, Tata McGraw Hill, Sixth edition, 2011
3. Raghu Ramakrishnan , Johannes Gehrke, “Database Management Systems”, Tata McGraw Hill, Third Edition, 2004

16PCS2ES01 SOFT COMPUTING

SEMESTER	II	CREDITS	3
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	4

OBJECTIVES

1. To learn the key aspects of soft computing
2. To know about the components and building block hypothesis of Genetic algorithm.
3. To understand the features of neural network and its applications
4. To study the fuzzy logic components

UNIT I 6Hrs

Neural Networks – Application Scope of Neural Networks – Fuzzy Logic – Genetic Algorithm- Hybrid Systems – Soft Computing

UNIT II 14Hrs

Classical Relation and Fuzzy Relations- Cartesian Product of Relation- Classical Relation- Fuzzy Relations- Tolerance and Equivalence Relations- Non interactive Fuzzy Sets – Membership Functions – Features of Membership Functions – Fuzzification – Methods of Membership Value Assignments-Defuzzification- Fuzzy Decision Making – Fuzzy Logic Control Systems

UNIT III 13Hrs

Genetic Algorithm – Introduction – Basic Operators and Terminologies in GA – Traditional Algorithm vs. Genetic Algorithm-

Sample GA – General Genetic Algorithm – The Schema Theorem-
Classification of Genetic Algorithm- Holland Classifier
Systems- Genetic Programming- Application of Genetic Algorithm

UNIT IV 14Hrs

Application of Soft Computing – Introduction- Fusion Approach of
Multispectral Image with SAR Image of Flood Area Analysis –
Optimization of TSP – GA based Internet Search Technique- Soft
Computing based Hybrid Fuzzy Controllers – Soft Computing based
Rocket Engine Control

UNIT V13Hrs

Soft Computing Techniques Using C and C++- Introduction – Neural
Network Implementation- Fuzzy Logic Implementation- Genetic
Algorithm Implementation

TEXT BOOK

1. S.N.Sivanandam, S.N.Deepa, “Principles of Soft Computing”, Wiley India, 2007

REFERENCE BOOKS

1. KwangH.Lee, “First course on Fuzzy Theory and Applications”, Springer–Verlag Berlin Heidelberg, 2005.
2. David E. Goldberg, “Genetic Algorithms in Search, Optimization and Machine Learning”, Addison Wesley, 2007.
3. N. P. Padhy, S. P. Simon, “Soft Computing with MATLAB Programming”, Oxford University Press, 2015.

16PCS2ES02 NEURAL NETWORKS

SEMESTER II CREDITS 3

CATEGORY MC(T) NO.OF HOURS/ WEEK 4

Objectives

1. To emphasize the step by step introduction to artificial neural networks and relates them to symbolic techniques.

2. To understand the importance of knowledge in intelligent system design.
3. To acquire the knowledge of model building in neural networks.

UNIT I 12 Hrs

Basic Neural Computational Models – Introduction , Basic concepts of Neural Networks, Inference and Learning, Classification Models, Association Models, Optimization Models, Self-Organization Models

UNIT II 12 Hrs

Learning – Introduction, Supervised and Unsupervised Learning, Statistical Learning, AI Learning, Neural Network Learning.

UNIT III 12 Hrs

Knowledge based Neural Networks – Introduction, Rule based Neural Networks, Network Training, Decision Tree–Based Neural Networks.

UNIT IV 12 Hrs

Incremental Learning – Introduction, Fundamental Principles, Symbolic methods, Neural Network Approaches, Incremental RBCN. Mathematical Modelling – Introduction, Applications of Neural Networks, Knowledge based Approaches.

UNIT V 12 Hrs

Complex domains – Introduction, Expert system heuristics, Hierarchical models, Hybrid models, Parallel Models, Differentiation Models, Control Networks. Discovery – Introduction, Symbolic methods, Neural Network Methods.

TEXT BOOK:

1. LiMinFu , “ Neural Networks in Computer Intelligence”, Tata McGraw Hill, 2003.

REFERENCE BOOKS:

1. Simon Haykin, “Neural Networks- A comprehensive foundation”, Pearson Education, 2001.

2. S.N.Sivanandam, S.Sumathi,S. N. Deepa “Introduction to Neural Networks using MATLAB 6.0”, MH,2006.
3. James A Freeman and Davis Skapura, “Neural Networks”, Pearson Education, 2004.

16PHE2FC01 LIFE SKILLS TRAINING

SEMESTER II	CREDITS 2
CATEGORY FC(T)	NO.OF HOURS/ WEEK 2+2

OBJECTIVES OF PG SYLLUBUS

1. To improve and sustain the primal level of competence and performance of PG students through an advanced training of holistic development of oneself.
2. To empower through various skills and strengthen them to face the future life issues and challenges.
3. To equip them with practical and value based learning of soft skills for a better life in future.

INSIDE CLASS HOURS (2 hrs)

Unit – I: Constructing Identity

Self Image – Understanding self image – shadows down the lane – self acceptance - Self Knowledge – Knowing oneself - Self confidence – Guilt and grudges - Power of belief – positive thinking– optimizing confidence - Self development – perception, attitude and Behavioural change, developing a healthy and balance personality - Self esteem – signs - indicators

Unit – II: Capacity Building

Motivation – Definition, types (Intrinsic and Extrinsic), Theories (Maslow’s hierarchical needs, etc), Factors that affect motivation, Challenges to motivation, Strategies to keep motivated, motivational plan. Time Management Skills– steps to improve time management, overcoming procrastination, assessing and planning weekly schedule, challenges, goal settings, components of goal settings, consequences of poor time management, control of interruption and distractions. Communication, public speaking, talents, creativity, learning,

Unit – III: Professional Skills

Leadership development skills – difference between leader and manager, different styles and their utilities, functions of leadership, application of knowledge, overcoming from obstacles, influential skills and Leadership qualities. Application skills – Managing Career and self-direction, Visionary thinking, formulating strategies, shaping strategies, building organizations relationships, change management. Project Management Skills, Independent working skills, Writing skills, Public Speaking, analytical Skills, Neo Research and Development. Problem solving skills – Process, approaches and its components, creative problem solving, Tools and techniques, application of SMART analysis and barriers to problem solving.

Unit – IV: Life Coping Skills

Life skills – Personal and reproductive Health, love, sex, marriage and family – family life education – Gender Equity - child bearing and Childrearing practices, Geriatric Care - adjustability Human Relationship – formal and informal - peer group – friends – same and other gender - family – Colleagues – community – emotional intelligence - Stress Coping skills – Definition of stress, strategies to alleviate stress, problem and emotion focused coping, techniques to reduce stress, stress reaction phases, crisis intervention steps, creating positive affirmations, Signs, Symptoms and Reactions of Stress.

Unit – V: Social Skills

Human Rights Education, Understanding Human Rights, International and national mechanisms, protection and preservation of HRs, Human Rights in the context of new, technological and electronic society, Peace Education, Social Harmony in the context of religious fundamentalism and fanaticism, Understanding Peace and Justice, Conflict Resolution Strategies

Reference books

1. Healing Your Emotional Self: A Powerful Program to Help You Raise Your Self-Esteem, Quiet Your Inner Critic, and Overcome Your Shame by Beverly Engel

2. Self-knowledge and self-discipline by B. W. Maturin
3. Motivation: Biological, Psychological, and Environmental (3rd Edition) by Lambert Deckers
4. Getting Things Done: The Art of Stress-Free Productivity by David Allen
5. Managerial Skills in Organizations by Chad T. Lewis
6. Social Intelligence: The New Science of Human Relationships by Daniel Goleman

Competence building	Career Preparatory Training
Power talk	Interview Guidance
Emotional Intelligence	Group Dynamics
Stress management	Leadership skills
Decision Making	Negotiation Skills
Positive image building	Creative writing

OUTSIDE THE CLASS HOURS (2 hrs)

- Each student will choose either of the above-mentioned modules and is expected to undergo a training/workshop in that module.
- She/he will have to accomplish ten hrs outside the class hours to fulfill the 2 credits.

Methodology

Inputs, ABL model, Documentaries, group activities and Interaction, Special workshop by professionals.

Evaluation

There will be end test and a Project for ‘inside the class hours’. Viva Voce will be conducted for the ‘Outside the class hours’.

16PCS3MC01 BIG DATA ANALYTICS

SEMESTER	III	CREDITS	3
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	4

OBJECTIVES

1. To explore the fundamental concepts of big data analytics
2. To learn to analyze the big data using intelligent techniques
3. To learn to use various techniques for mining data stream
4. To understand the applications using Map Reduce Concepts

UNIT I 12 Hrs

Introduction to Big Data Platform – Challenges of Conventional Systems - Intelligent data analysis –Nature of Data - Analytic Processes and Tools - Analysis vs Reporting - Modern Data Analytic Tools Statistical Concepts: Sampling Distributions - Re-Sampling - Statistical Inference - Prediction Error.

UNIT II 12 Hrs

Introduction To Streams Concepts – Stream Data Model and Architecture - Stream Computing Sampling Data in a Stream – Filtering Streams – Counting Distinct Elements in a Stream – Estimating Moments – Counting Oneness in a Window – Decaying Window - Real time Analytics Platform(RTAP) Applications - Case Studies - Real Time Sentiment Analysis, Stock Market Predictions.

UNIT III 12 Hrs

History of Hadoop- The Hadoop Distributed File System – Components of Hadoop- Analyzing The Data with Hadoop- Scaling Out- Hadoop Streaming- Design of HDFS-Java interfaces to HDFS Basics-Developing a Map Reduce Application-How Map Reduce Works-Anatomy of a Map Reduce Job run-Failures-Job Scheduling-Shuffle and Sort – Task execution - Map Reduce Types and Formats-Map Reduce Features

UNIT IV 12 Hrs

Setting up a Hadoop Cluster - Cluster specification - Cluster Setup and Installation - Hadoop Configuration-Security in Hadoop - Administering Hadoop – HDFS - Monitoring-Maintenance- Hadoop benchmarks- Hadoop in the cloud

UNIT V 12Hrs

Applications on Big Data Using Pig and Hive – Data processing operators in Pig – Hive services HiveQL – Querying Data in Hive - fundamentals of HBase and Zookeeper - IBM Info Sphere Big Insights and Streams. Visualizations - Visual data analysis techniques, interaction techniques- Systems and applications

TEXT BOOK

1. Michael Berthold, David J. Hand, “Intelligent Data Analysis”, Springer, 2007.
2. Chris Eaton, Dirk DeRoos, Tom Deutsch, George Lapis, Paul Zikopoulos, “Understanding Big Data: Analytics for Enterprise Class Hadoop and Streaming Data”, Mc Graw Hill Publishing, 2012.

REFERENCE BOOKS

1. Anand Rajaraman and Jeffrey David Ullman, “Mining of Massive Datasets”, Cambridge University Press, 2012.
2. David Corrigan , “Harness the Power of Big Data The IBM Big Data Platform”, Tata McGraw Hill Publications, 2012
3. Michael Minelli, Michele Chambers, Ambiga Dhiraj, “Big Data, Big Analytics: Emerging Business Intelligence and Analytic Trends for Today's Businesses”, Wiley Publications, 2013
4. Carol Long (ed.), “Data Science and Big Data Analytics”, EMC Education Services, John Wiley & Sons, 2015.

16PCS2MC02 DIGITAL IMAGE PROCESSING

SEMESTER III	CREDITS	3
CATEGORY MC(T)	NO.OF HOURS/ WEEK	4

Objectives:

1. To study the image fundamentals of for image processing.
2. To study the Image enhancement technique and mathematical transforms necessary for image processing.
3. To understand the image compression methods

UNIT I 12 Hrs

Digital Image Fundamentals And Transforms: Elements of visual perception – Image sampling and quantization Basic relationship between pixels – Basic geometric transformations- Introduction to Fourier Transform and DFT – Properties of 2D Fourier Transform – FFT – Separable Image Transforms -Walsh –Hadamard – Discrete Cosine Transform.

UNIT II 12 Hrs

Image Enhancement Techniques: Spatial Domain methods: Basic grey level transformation – Histogram equalization – Image subtraction – Image averaging –Spatial filtering: Smoothing, sharpening filters –Laplacian filters – Frequency domain filters: Smoothing – Sharpening filters – Homomorphic filtering.

UNIT III 12 Hrs

Image Restoration: Model of Image Degradation/restoration process – Noise models – Blind image restoration – Pseudo inverse – Singular value decomposition.

UNIT IV 12 Hrs

Image compression: Lossless compression: Variable length coding – LZW coding – Bit plane coding predictive coding- DPCM. Lossy Compression: Transform coding – Wavelet coding – Basics of Image compression standards: JPEG, MPEG.

UNIT V12 Hrs

Boundary representation: chain codes- Polygonal approximation – Boundary segments – boundary descriptors: Simple descriptors- Fourier descriptors - Regional descriptors –Simple descriptors- Textures

TEXT BOOK:

1. Rafael.C.Gonzalez&Richard.E.Woods, “Digital Image Processing”, PHT, Third Edition.

REFERENCE BOOKS:

1. B.Chand&P.DuttaMajumder, “Digital Image Processing”, PHT, 2000.
2. S.Annadurai&R.Shanmugalakshmi, “Digital Image Processing”, Pearson, Sixth Edition, 2011
3. S. Sridhar, “Digital Image Processing”, Oxford University Press, 2011.

16PCS3MC03 DIGITAL IMAGE PROCESSING – LAB

SEMESTER III	CREDITS	3
CATEGORY MC(T)	NO.OF HOURS/ WEEK	4

Objectives:

1. To study the image fundamentals of image processing.
2. To study the Image enhancement techniques and mathematical transforms.
3. To apply all the image processing concepts in MatLAB.

Exercises:

1. Digital Image Import, Export, and Conversion Image data import and export, conversion of image types and classes
2. Digital Image Display and Exploration Interactive tools for image display and exploration
3. Geometric Transformation Scale, rotate, padding and shearing transformations,
4. Spatial Referencing Provide spatial information

5. Image Registration Align images using automatic or control point registration
6. Image Enhancement Contrast adjustment, morphological filtering, deblurring, and other image enhancement tools
7. Image Analysis Region analysis, texture analysis, pixel and image statistics
8. Image Segmentation Color based segmentation using l^*a^*b color space and K-means algorithm.
9. Measuring Image features Identify the round objects and the regions
10. Working with large images Block processing

16PCS3MC04 CRYPTOGRAPHY AND CYBER SECURITY

SEMESTER III CREDITS 3

CATEGORY MC(T) NO.OF HOURS/ WEEK 4

Objectives:

1. To study various encryption and decryption algorithms and their applications in Cryptography.
2. To gain knowledge in key management and hashing.
3. To learn about the security issues in cyberspace and its laws.

UNIT I 13 Hrs

Services, mechanisms and attacks - A model for network security- Symmetric Cipher model- Substitution techniques- Transposition techniques- Simplified DES-Block Cipher principles- the strength of DES – Block Cipher design principles – Modular Arithmetic – Euclid’s Algorithm. UNIT II 12 Hrs Triple DES - Blow fish - Advanced Symmetric Block Ciphers- RC4 -Stream Cipher-Random Number generation - Public Key cryptography and RSA.

UNIT III 13 Hrs

Key Management - Diffie Hellmann key exchange-Message authentication and hash functions – Hash algorithms – MD5 – SHA -

Digital signatures and authentication protocols – Digital signature standard.

UNIT IV 11 Hrs

Intruders- intrusion detection- password management- viruses and Related threats - virus counter-measures- Firewall design principles-Trusted systems.

UNIT V 11 Hrs

Laws, Investigation and Ethics- Types of Computer Crime - The Computer and the Law- Intellectual Property and Law - Computer Forensics.

TEXT BOOKS

1. William Stallings, “Cryptography and Network Security Principles and Practices”, Fifth edition, 2011.
2. Mark S.Morkow, Jim Breithaupt, “Information Security: Principles and Practices”, Pearson, Second Edition, 2014.

REFERENCE BOOKS

1. William Stallings, “SNMP, SNMPV2, SNMPV3 and RMON1 and 2”, Addison Wesley, 1999.
2. Uyles Black, “Network Management Standards”, McGraw Hill, 1995.
3. AtulKahate, “Cryptography and Network Security”, Tata McGraw – Hill, 2003
4. Roberta Bragg, Mark Rhodes-Ousley, Keith Strassberg, “Network Security”, Tata McGraw- Hill, 2004
5. BehrouzA.Forouzan, DebdeepMukhopadhyaya, “Cryptography and Network Security”, Tata McGraw Hill, second edition, 2010
6. Nina Godbole, “Information Systems Security”, Wiley India Pvt., Limited, 2009.

16PCS3PJ01 MINI PROJECT

SEMESTER	III	CREDITS	5
CATEGORY	MC(T)	NO.OF HOURS/ WEEK	5

Objectives:

1. To provide skills to identify a problem to be automated with social relevance.
2. To develop skills in analysing real world problems and prepare problem statements
3. To design with various design representation including architectural design, database design and GUI design
4. To apply the coding skills and develop the system
5. To prepare test cases and test the system through unit testing, integration testing and acceptance testing
6. Apply proper validation to the system developed.
7. To prepare user manual and maintenance guidelines
8. To provide documentation and presentation skills

Components	Review 1	Review 2	Final Review
Documentation	5	5	1
Seminar / presentation	10	5	1
Viva-voce	10	5	1
Demo		10	2
Total	25	25	5

16PCS3ES01 ARTIFICIAL INTELLIGENCE

SEMESTER	III	CREDITS	3
CATEGORY	ES(T)	NO.OF HOURS/ WEEK	4

OBJECTIVES

1. To learn the basics of designing intelligent agents that can solve general purpose problems
2. To represent and process knowledge, plan and act, reason under uncertainty and can learn from experiences
3. To understand the concept learning from observation

UNIT I 10Hrs

Introduction – Agents – Problem formulation – uninformed search strategies – heuristics – Informed search strategies – constraint satisfaction

UNIT II 10Hrs

Logical agents – propositional logic – inferences – first-order logic – inferences in first order logic – forward chaining – backward chaining – unification – resolution

UNIT III 10Hrs

Planning with state-space search – partial-order planning – planning graphs – planning and acting in the real world

UNIT IV 15Hrs

Uncertainty – review of probability - probabilistic Reasoning – Bayesian networks – inferences in Bayesian networks – Temporal models – Hidden Markov models

UNIT V 15Hrs

Learning from observation - Inductive learning – Decision trees – Explanation based learning – Statistical Learning methods - Reinforcement Learning

TEXT BOOK

1. Stuart J Russell and Peter Norvig, “Artificial Intelligence – A Modern Approach”, Third Edition, Pearson Education, 2010

REFERENCE BOOKS

1. Elaine Rich, Kevin Knight, Shivshankar B Nair., “Artificial Intelligence (SIE)”, McGraw Hill, 2008.
2. Deepak Khemani, “Artificial Intelligence”, Tata McGraw Hill Education, 2013

16PCS3ES02 CLOUD COMPUTING

SEMESTER	III	CREDITS	3
CATEGORY	ES(T)	NO.OF HOURS/ WEEK	4

OBJECTIVES:

1. To gain knowledge about the technologies and developing cloud services.
2. To understand the concept of virtualization and design of cloud services.
3. To acquire the knowledge in various services and applications over the cloud.

UNIT I 12 Hrs

Introduction to Cloud Computing: Cloud Computing in Nutt shell-Roots of Cloud Computing- Types of Clouds-Features of a Cloud-Cloud Infrastructure Management-Challenges and Risks- Migrating in to a Cloud.

UNIT II 12 Hrs

Integration as a Service-Introduction-Onset of Knowledge Era-Evolution of SaaS-Challenges – Approaching the SaaS Integration-New Integration Scenarios-Integration Methodologies-SaaS Integration Services-B2B Services.

UNIT III 14 Hrs

Cloud Service Models: Infrastructure as a Service (IaaS): Introduction to IaaS, Resource Virtualization, Server, Storage, Network, Case studies – Platform as a Service (PaaS): Introduction to PaaS, Cloud platform & Management, Computation, Storage.

UNIT IV 12 Hrs

Cloud Deployment Models: Deployment Models Introduction – Public Deployment Model – Private Deployment Model – Virtual Private Deployment Model – Hybrid Deployment Model – Community Deployment Model.

UNIT V 10 Hrs

Cloud Challenges: Organizational Readiness and Change management in cloud – Data Security in the Cloud – Legal Issues in Cloud Computing – Production Readiness for Cloud Services.

TEXT BOOK:

1. RajkumarBuyya, James Broberg and AndrzejM.goscinski, “Cloud Computing: Principles and Paradigms”, John Wiley & Sons,2010.

REFERENCE BOOKS:

1. Antony T.Velte, Toby J.Velte, Robert Elsenpeter, “Cloud Computing: A Practical Approach”, Tata McGraw- Hill Pub, 2010.
2. Haley beard, “Cloud Computing best practices for managing and measuring processes for on-demand computing, applications and Data centers in the cloud with SLAs”, Emereo Pvt.Limited,2009.

WEB RESOURCES:

1. <http://www.mb.net/resources/cloud-computing-resources.aspx>.
2. <http://www.mastertheboss.com/cloud-computing/in-the-cloud-computing-a-beginners-tutorial>.

16PCS3ES03 MOBILE COMPUTING

SEMESTER	III	CREDITS	3
CATEGORY	ES(T)	NO.OF HOURS/ WEEK	4

Objectives:

1. To learn the basics of mobile computing and the types of communications used.
2. To know the protocols and the security mechanisms used in Mobile Computing.
3. To explore the features of Mobile Computing platforms.

UNIT I 12Hrs Introduction:

Mobile Computing – Dialog Control – Networks – Middleware and Gateways – Application and Services – Developing Mobile Computing Applications – Security in Mobile Computing – Necessity of Standards – Standards Bodies – Mobile Computing Architecture: Architecture for Mobile Computing – Three-tier Architecture – Design Considerations for Mobile Computing.

UNIT II 12Hrs Emerging Technologies:

Bluetooth – Radio Frequency Identification – Wireless Broadband - Mobile IP – Global System for Mobile Communications: Global System for Mobile Communications – GSM Architecture – GSM Entities – Call Routing in GSM – PLMN interfaces – GSM Addresses and Identifiers – Network Aspects in GSM – Mobility Management

UNIT III 12Hrs General Packet Radio Service:

Introduction – GPRS and Packet Data Network – GPRS Network Architecture – GPRS Network Operations – Data Services in GPRS – Applications for GPRS – Limitations for GPRS – Billing and Charging in GPRS – Enhanced Data Rates for GSM Evolution.

UNIT IV 12Hrs Wireless Application Protocol:

Introduction – WAP – MMS –MMS Architecture – MMS Transaction flows – CDMA and 3G: Spread-Spectrum Technology – CDMA versus GSM – Wireless LAN: Introduction – Advantages – Architecture – Mobile Ad hoc Networks and Sensor Networks – Wireless Access in Vehicular Environment.

UNIT V 12Hrs Security Issues in Mobile Computing:

Introduction – Information Security – Security Techniques and Algorithms – Security Protocols – Public Key Infrastructure – Trust – Security Models – Security Frameworks for Mobile Environment – Next Generation Networks: Narrowband to Broadband – Multi Protocol Label Switching – Wireless Asynchronous Transfer Mode.

TEXT BOOK

Asoke K Talukder, Hasan Ahmed, Roopa R Yavagal, “Mobile Computing – Technology, Applications and Service Creation”, Second Edition, Tata McGraw-Hill, 2010.

REFERENCE BOOKS

1. Krzysztof Wesolowski , “Mobile Communication Systems” , Wiley, 2012.
2. UweHansmann, LotharMerk, Martin S. Nicklous, Thomas Stober, “Principles of Mobile Computing”, Second Edition, Springer International Edition, 2003.

WEB RESOURCES

1. http://www.tutorialspoint.com/mobile_computing/index.htm
2. <http://www.tutorialspoint.com/gsm/index.htm>
3. <http://www.tutorialspoint.com/gprs/index.htm>

16PCS3ES04 INTERNET OF THINGS

SEMESTER III	CREDITS	4
CATEGORY ES(T)	NO.OF HOURS/ WEEK	4

Objectives:

1. To learn the basic concepts of the internet of things
2. To understand the concepts of smart objects
3. To learn the models of IoT implementation

UNIT I 12Hrs Introduction – Putting IoT Forward to the Next Level: IoT Today- IoT Tomorrow – Potential Success Factor– IoT Strategic Research and Innovation Agenda – IoT vision - IoT Strategic Research and Innovation Directions – IoT Smart-X Applications – IoT and Related Future Internet Technologies – Networks and Communication- Processes- Data Management- Security, Privacy & Trust- Device Level Energy Issues- IoT Related Standardization-IoT Protocols Convergence

UNIT II 12Hrs

Internet of Things Global Standardization - State of Play- IoT Vision- IoT Standardization Landscape- ERC Research Projects Positions- Dynamic Context-Aware Scalable and Trust- based IoT Security, Privacy Framework- Main Concepts and Motivation of the Framework-A Policy-based Framework for Security and Privacy in Internet of Things

UNIT III 12Hrs

Scalable Integration Framework for Heterogeneous-Smart Objects, Applications and Services – Introduction-IPv6 Potential- IoT6 - IPv6 for IoT- Adapting IPv6 to IoT Requirements-IoT6 Architecture- Discovery -IoT6 Integration with the Cloud and EPICS- Enabling Heterogeneous Integration- IoT6 Smart Office Use-case- Scalability Perspective

UNIT IV 12Hrs

Internet of Things Applications - From Research and Innovation to Market Deployment – Introduction – Open IoT - Project Design and Implementation- Execution and Implementation Issues- Project Results- Acceptance and Sustainability – iCORE- Design- Project Execution - Results Achieved. Compose- SmartSantander- Fitman-OSMOSE

UNIT V 12Hrs

Bringing IP to Low-power Smart Objects: The Smart Parking Case in the CALIPSO- Smart Parking- CALIPSO Architecture- CALIPSO Implementation and Experimentation with Smart Parking - Insights on Federated Cloud Service Management and the Internet of Things- Federated Cloud Services Management- Federated Management Service Life Cycle- Self- management Lifecycle-Self-Organizing Cloud Architecture- Horizontal Platform

TEXT BOOK:

OvidiuVermesan (Editor), Peter Friess (Editor), “Internet of Things Applications - From Research and Innovation to Market Deployment”, River Publishers Series in Communications, 2014.

REFERENCES:

1. Samuel Greengard ,“The Internet of Things”, The MIT Press Essential Knowledge series, 2015.
2. Alfred Lui, Ann Light, Claire Rowland, Elizabeth Goodman, Martin Charlier, “Designing Connected Products: UX for the Consumer Internet of Things”, O’Reilly Media, 2015.
3. Adrian McEwen, Hakim Cassimally, “Designing the Internet of Things”, Wiley, 2013.
- 4.

16PCS3TP01 SUMMER TRAINING PROGRAMME

SEMESTER	III	CREDITS	1
CATEGORY	TP(P)	NO.OF HOURS/ WEEK	3 – 4 WK

1. A staff member of a department (GUIDE) will be monitoring the performance of the candidate.
2. The summer training program falls between Semester II and III. Students are expected to undergo this training soon after the second semester examinations.
3. The training will commence not later than one week after the completion of the semester examination
4. Organizations for the summer placement must be confirmed before the commencement of the second continuous internal tests.
5. Students must submit letter of induction to the respective guide within the first week of the internship.
6. The student has to spend a total of 20 working days in the respective field.
7. Students are expected to submit weekly reports along with daily time sheets to the respective supervisors.
8. The reports will be used to evaluate the student’s performance.

9. Students should submit a letter of completion from the organization duly signed by the authorities.
10. If the staff is satisfied with the performance of student, he/she will be marked "COMPLETED" at the end of the semester and the details will be submitted to COE office through the HOD

16PCS3ID01 THEORY OF COMPUTATION AND COMPILER DESIGN

SEMESTER	III	CREDITS	6
CATEGORY	ID(T)	NO.OF HOURS/ WEEK	6

Objectives:

1. To introduce the mathematical foundations of computation including automata theory, the theory of formal languages and grammars
2. To enhance/develop students' ability to understand and conduct mathematical proofs for computation and algorithms
3. To give an overall view of the different phases of compilation and its purpose

UNIT I 18 Hrs

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 18 Hrs

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

UNIT III 18 Hrs

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 18 Hrs

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

UNIT V 18 Hrs

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

TEXT BOOK:

1. J.P.Tremblay, R. Manohar, “Discrete Mathematical Structures with Applications to Computer science”, TataMcGrawHill.2009
2. Aho V Alfred, Lam S. Monica, Sethi Ravi and Ullman D. Jeffrey, “Compilers:Principles,TechniquesandTools”, Second Edition, Pearson Education,.2014

REFERENCE BOOKS:

1. K.Anuradha, Y.Vijayalakshmi,” Formal Languages and Automata Theory” , CBS Publishers.2013
2. Hopcroft E. John, Motwani Rajeev, Ullman G Jeffrey, “Introduction to Automata theory, Languages , and Computation”, Third edition , Pearson Education.2008
3. Vivek Kulkarni, “Theory of Computation “, Second Edition, Oxford University Press, 2014.

16PCS4PJ01 MAJOR PROJECT

SEMESTER	IV	CREDITS	24
CATEGORY	MC(P)	NO.OF HOURS/ WEEK	30

Objectives:

1. To study a real world problem at a software development industry and propose a solution a solution for that.
2. To develope a system by designing, coding and testing.
3. Apply the software engineering paradigm to the problem.