Syllabus of III semester MSc(Comp. Sc.) programme, w.e.f. 2017-18 (according new regulations w.e.f. 2016-17)

Course Code	Subject Title	Teaching Scheme Hrs/week		Examination				Credits
				Exam. Duration (Hrs)	Marks			
		Theory	Practical		Theory/ Practical	IA	Total	
III Semester MSc(Comp. Sc.) new syllabus (w.e.f. 2017-18 and onwards)								
17MScCSCS 3.1	Software Engineering	4	--	3	80	20	100	4
17MScCSCS 3.2	Computer Networks and Security	4	--	3	80	20	100	4
17MScCSCS 3.3	Object Oriented Programming in Java	4	--	3	80	20	100	4
17MScCSCS 3.4	Web Programming	3	--	3	80	20	100	3
17MScCSCE 3.5	a. Design and Analysis of Algorithms b. .NET Technologies c. Internet of Things d. UNIX System Programming	3	--	3	80	20	100	3
17MScCSOE 3.6 *	a. E-Commerce b. Management Information Systems	4	--	3	80	20	100	4
17MScCSPL 3.7	Prog. Lab.: Web Programming	--	6	3	80	20	100	3
17MScCSPL 3.8	Prog. Lab. Java and Network Lab.	--	6	3	80	20	100	3
Total		22	12				800	28

CS: Core Course/Subject   CE: Core Elective Course   OE: Open Elective

* Open-elective course to be chosen by the students of other departments

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17MScCSCS 3.1	**Software Engineering**	
Credits: 4	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   10Hrs
Introduction to Software Engineering: FAQs about software engineering, systems engineering, system availability and reliability, software processes, project management.

UNIT II   10Hrs
Software Requirement: Software requirements, requirements engineering project, system models, critical systems specification, formal specification.

UNIT III   12Hrs
Software Design: Architectural designs, distributed system architectures, application architectures, object oriented design, real-time software design, user interface design.

UNIT IV   08Hrs
Software Development: Rapid software development, software reuse, component-based software engineering, critical systems development, software evolution.

UNIT V   12Hrs
Verification, Validation and Management: Software inspections, static analysis, verification and formal methods, software testing, critical systems validation.
Managing people, software cost estimation, quality management, process improvement, configuration management.

References:

1. Sommerville, Software Engineering, 8/e, Pearson Education.
2. Pressman S. Roger, Software Engineering, Tata McGraw Hill.
3. Jalote Pankaj, An integrated Approach to Software Engineering, Narosa Publishing House.
4. Shooman, Software Engineering, McGraw Hill.
5. C. Ghezzi, M. Jazayeri and D. Mandrioli, Fundamentals of Software Engineering, Prentice Hall of India

17MScCSCS 3.2	**Computer Networks and Security**	
Credits: 4	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   10Hrs
Introduction: Networks, types of connections – Topologies, Protocols and Standards – OSI Model, TCP/IP Protocol Suite, Functions of Data Link Layer.
Wireless WANs: Cellular Telephone and Satellite Networks. SONET, Virtual-Circuit Networks**:** Frame Relay and ATM.

UNIT II   12Hrs
Network Layer: Logical addressing – IPV4, IPV6, Address mapping–ARP, RARP, BOOTP and DHCP, ICMP, Delivery, Forwarding, Unicast and Multicast Routing protocols.

UNIT III   10Hrs
Transport Layer: Process to Process Delivery, User Datagram Protocol, Transmission Control Protocol, SCTP, Congestion Control with Examples, QoS.

UNIT IV   10Hrs
Application Layer: Domain Name Space, DDNS, Remote Logging, Electronic Mail, and File Transfer, WWW, HTTP

UNIT V: 10Hrs
Network Management: SNMP, Network Security- Security Services, Security in the Internet: IPSec, SSUFLS, PGP, VPN, and Firewalls

References:

1. Behrouza A Forouzan, Data Communication & Networking, Tata McGraw Hill.
2. Andrew S. Tanenbaum, Computer Networks, 5th Ed, Pearson Education
3. William Stallings, Data and Computer Communications, 7th Edition, PHI.
4. W. Stalling, Wireless Communication and Networks, Pearson Education.
5. Brijendra Singh, Data Communication and Computer Networks, PHI.
6. http://highered.mheducation.com/sites/0072967757/index.html

17MScCSCS 3.3	**Object Oriented Programming in Java**	
Credits: 4	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   10Hrs
OOP concepts Review - Data abstraction, encapsulation, inheritance, benefits of inheritance, polymorphism, classes and objects, Procedural and object oriented programming paradigms.
Java programming - History of Java, comments, data types, variables, constants, scope and life time of variables, operators, operator hierarchy, expressions, type conversion and casting, enumerated types, control flow block scope, conditional statements, loops, break and continue statements, simple java stand-alone programs, arrays, console input and output, formatting output, constructors, methods, parameter passing, static fields and methods, access control, this reference, overloading methods and constructors, recursion, garbage collection, building strings, exploring string class.

UNIT II   10Hrs
Inheritance - Inheritance hierarchies super and sub classes, Member access rules, super keyword, preventing inheritance: final classes and methods, the Object class and its methods.
Polymorphism - dynamic binding, method overriding, abstract classes and methods.
Interfaces - Interfaces vs. Abstract classes, defining an interface, implementing interfaces, accessing implementations through interface references, extending interfaces.
Inner classes - uses of inner classes, local inner classes, anonymous inner classes, static inner classes, examples.
Packages - Defining, Creating and Accessing a Package, importing packages.

UNIT III   10Hrs
Exception handling - Dealing with errors, benefits of execution handling, the classification of exceptions- exception hierarchy, checked exceptions and unchecked exceptions, usage of try, catch,

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throw, throws and finally, re throwing exceptions, exception specification, built in exceptions, creating own exception sub classes.

Multithreading – Thread concept, thread states, creating threads, interrupting threads, thread priorities, synchronizing threads, inter-thread communication, procedure consumer pattern.

UNIT IV   10Hrs

Collection Framework in Java - Introduction to Java Collections, Overview of Java Collection frame work, Generics, Commonly used Collection classes Array List, Vector, Hash table, Stack, Enumeration, Iterator, String Tokenizer, Random, Scanner, calendar and Properties

Files - streams - byte streams, character streams, text input/output, binary input/output, random access file operations, File management using File class.

UNIT-V   12Hrs

GUI Programming with Java - The AWT class hierarchy, Introduction to Swing, Swing vs, AWT, Hierarchy for Swing components, Containers - JFrame, JApplet, JDialog, JPanel, Overview of some swing components Jbutton, JLabel, JTextField, JTextArea, simple swing applications, Layout management - Layout manager types - border, grid and flow

Event handling - Events, Event sources, Event classes, Event Listeners, Relationship between Event sources and Listeners, Delegation event model, Examples: handling a buttong click, handling mouse events, Adapter classes.

Applets - Inheritance hierarchy for applets, differences between applets and applications, life cycle of an applet, passing parameters to applets, applet security issues.

References:

1. Herbet Schidt and Dale Srien, Java Fundamentals - A comprehensive Introduction, TMH.
2. P.J. Deitel and H.M. Deitel, Java for Programmers, Pearson education
3. P.J. Deitel and H.M. Deitel, Java: How to Program, PHI.
4. S. Malhotra and S. Choudhary, Programming in Java, Oxford Univ. Press.

17MScCSCS 3.4	**Web Programming**	
Credits: 3	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   08Hrs

Overview: Web page Designing using HTML, Java Script-Object, names, literals, operators and expressions- statements and features-events - windows - documents - frames - data types - built-in functions- Browser object model - Verifying forms.-HTML5- CSS3- HTML 5 canvas. XML: DTD, Namespaces, XML schemas, displaying raw XML documents, Displaying XML documents with CSS, XSLT style sheets, XML processors

UNIT II   10Hrs

PHP : Server-side web scripting, Installing PHP, Adding PHP to HTML, Syntax and Variables, Passing information between pages, Strings, Arrays and Array Functions, Numbers, Basic PHP errors / problems. Database access with PHP and MySQL, PHP/MySQL Functions, Displaying queries in tables, Building Forms from queries, String and Regular Expressions, Sessions, Cookies and HTTP, Type and Type Conversions.

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UNIT III   10Hrs
Ruby on Rails: Origins and uses of Ruby, Scalar types and their operations, Simple input and output, Control statements, Arrays, Hashes, Methods, Classes, Code blocks and iterators, Pattern matching. Overview of Rails, Document requests, Processing forms, Rails applications with Databases, Layouts.

UNIT IV   10Hrs
JDBC Overview – JDBC implementation – Connection class – Statements – Catching Database Results, handling database Queries. Networking– InetAddress class – URLclass- TCP sockets - UDP sockets, Java Beans –RM.
Java Servlets – life cycle of a servlet. The Servlet API, Handling HTTP Request and Response, using Cookies, Session Tracking. Introduction to JSP.

UNIT V   07Hrs
Introduction to Ajax: Overview of Ajax; The basics of Ajax; Rails with Ajax.

References:

1. Thomas Powell, Web Design The complete Reference, Tata McGrawHill
2. Thomas Powell, HTML and XHTML The complete Reference, Tata McGrawHill
3. PHP for the Web: Visual Quick Start Guide, 4th Edition, Peachpit Press
4. Beginning PHP 5.3 (Wrox, free ebook: http://it-ebooks.info/book/713/)
5. P.J. Deitel and H.M. Deitel, Java for Programmers, Pearson education
6. Chris Bates, Web Programming Building Internet Applications, 3rd Edition, Wiley India, 2011
7. Pragmatic Dave Thomas, Andy Thomas, et al., Programming Ruby: The Pragmatic Programmer's Guide,
8. Sam Ruby, Agile Web Development with Rails (4th edition) (beta) http://pragprog.com/titles/rails4/agile-web-development-with-rails

17MScCSCE 3.5	a. Design and Analysis of Algorithms b. .NET Technologies c. Internet of Things d. UNIX System Programming	
Credits: 3	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

17MScCSOE 3.6	**a. E-Commerce**	
Credits: 4	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I 10Hrs

Overview of Electronic Commerce: Main Activities of E-Commerce, Broad Goals of E-Commerce, E-Commerce technical Components, Functions of E-Commerce, Prospectus of Ecommerce, Lessons from E-commerce Evolution, Scope of E-commerce.

UNIT II 10Hrs

E-commerce Technical Architecture, E- Commerce Strategies, E-commerce Essentials, Ecommerce applications, Foundation of E-commerce, Growth of E-Commerce, Advantages of E-Commerce, Disadvantages of E-commerce, progress of E-commerce in India.

UNIT III 10Hrs

Driving the E-Commerce revolution. E-Commerce activities, Matrix of E-commerce models, B2C, B2B, B2B Boom, E-commerce opportunity Frame work, Developing an E-commerce Strategy, International E-commerce, International Strategy Development, Dotcom Companies.

UNIT IV 10Hrs

Electronic Market:-Online Shopping, Online Purchasing, Electronic Market, Three models of Electronic Market, Markets category, International Marketing, one-to –one Marketing, Permission Marketing, pull and push technologies, B2B Hubs, B2B market places, B2B exchange.

UNIT V 12Hrs

Electronic Business: Electronic Business applications Emerging applications, Electronic Business Architecture, AMR Model for Electronic Business, Evolution of Electronic Business Application, Dotcom companies, The Indian scenario for E-Business, electronic business implementations, B2B E-commerce, B2C E-commerce, B2B Market Place.

Implementation of E-Commerce: WWW.EBAY.COM - B2C Website – Registration, Time factor, Bidding process, Growth of eBay; PayPal – New Trend in Making Payments Online; National Electronic Funds Transfer.

References:

1. C.S.V Murthy, E-Commerce Concepts. Models, Strategies, Himalaya Publishing House.
2. Janice Reynolds, The Complete E-Commerce Book: Design, Build & Maintain a Successful Web-based Business, CRC Press.
3. Ravi Kalakota and Andrew B Whinston, Frontiers of Electronic Commerce, Pearson Education
4. Henry Chan, Raymond Lee, Tharam Dillon, Elizabeth Chang, E-Commerce: Fundamentals and Applications
5. Joseph, E-Commerce : An Indian Perspective, PHI
6. Kamlesh K. bajaj and Debjani Nag., E-commerce (The cutting Edge of Business) , I & II Edition, Tata McGraw Hill.
7. https://www.tutorialspoint.com/e_commerce/

17MScCSOE 3.6	**b. Management Information Systems**	
Credits: 4	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   10Hrs

Management Information System(MIS)- concept, Definition and role of MIS, E-business enterprise, strategic management of business, information security challenges in e-enterprises, impact of information technology on society.

UNIT II   10Hrs

Decision making-concepts and process, MIS and decision making. Information- concepts, classificationvalue and methods of data and information collection, MIS and the information and knowledge.

UNIT III   10Hrs

Systems concept- types of systems, classes of systems, general model of MIS, systems analysis, systems development model-SSAD, MIS and systems analysis, Object oriented analysis, Object oriented, OOSAD development life cycle.

UNIT IV   10Hrs

Development of MIS, Decision Support systems and knowledge management, knowlwdge based expert systems, MIS and benefits of DSS, Enterprise resource planning systems-models and benefits .

UNIT V   12Hrs

Information Technology- data, transaction, and application processing; database concepts, RDBMS, client-server architecture, Data Warehouse-concept and architecture, business intelligence, data warehouse and MIS, models of e-business, electronic payment systems, security, MIS in web environment. Case studies.

References:

1. W. S. Jawadekar,Management Information Systems, 4th edition, McGraw Hill.
2. James O' Obrien and George M. Marakas, Management Information Systems, 10th edition, McGraw Hilledition.
3. Jaiswal and Mittal, Management Information Systems, Oxford University Press.
4. Turban and Aronson, Decision Support systems and intelligent systems, Pearson Education.

17MScCSCS 3.7	**Prog. Lab.: Web Programming**	
Credits: 3	Lab. Duration: 6Hrs/week	Max. Marks: 80 IA: 20

Suggested Assignments:

1. Develop and demonstrate a XHTML document that illustrates the use external style sheet, ordered list, table, borders, padding, color, and the tag.
2. Develop and demonstrate a XHTML file that includes Javascript script for obtaining n through prompt and computing n Fibonacci numbers
3. Design an XML document to store information about a student.
4. Write a PHP program to store current date-time in a COOKIE and display the "Last visited on" date-time on the web page upon reopening of the same page.
5. Write a PHP program to store page views count in SESSION, to increment the count on each refresh, and to show the count on web page.
6. Create a XHTML form with Name, Address Line 1, Address Line 2, and E-mail text fields. On submitting, store the values in MySQL table. Retrieve and display the data based on Name.
7. Using PHP and MySQL, develop a program to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings.
8. Develop a A COMPANY database browser application. The initial Web page in this application lists all the departments in the company. By following hyperlinks, the user may see more details of departments, employees, and projects in three separate Web pages. Implement the browser program using four PHP scripts: (a) companyBrowse.php: This script lists all the departments in the company in a tabular form (b) deptView.php: (c) empView.php: (d) projectView.php:
9. Implement the problem of finding employee names given their social security number as a Web application. Design two Web pages: 1. The first Web page would contain a HTML form that contains a select list of social security numbers of employees and a submit button. 2. Upon choosing a social security number and submitting the form in the first Web page produces the second Web page that lists the name of the employee.
10. Mini Project: Illustrate online address/contact book application using PHP amd MySQL. The application should perform the following functions: (1) ADD a new contact. (2) DELETE one or more contacts. (3) SEARCH contacts by substring match on name. (4) LIST all contacts.
11. Illustrate JDBC connectivity to update customer information.
12. Illustrate Simple servelet that generates plain text.
13. Write a Servlet program to implement Session Tracking
14. JSP program for basic arithmetic operations
15. Creating a Java program that connects to a database using JDBC Write a java program to insert the Data of new employee.
16. Write a Java program that loads student name and branch from database It takes a name or phone number as input and prints the corresponding other value from the hash table (hint: use hash tables).
17. Write a Ruby program to create a user defined function and illustrate to call the function.
18. Write a Ruby program to 1) Fetch the values from textbox and radio button 2) Explain the session and cookies in rails.
19. Build a Rails application to accept book information viz. Accession number, title, authors, edition and publisher from a web page and store the information in a database and to search for a book with the title specified by the user and to display the search results with proper headings

17MScCSCS 3.8	**Prog. Lab.: Java Lab.**	
Credits: 3	Lab. Duration: 6Hrs/week	Max. Marks: 80 IA: 20

Students are encouraged to use Linux-Open Source OS for executing java –programs using javac compiler available in Linux.

Suggested Assignments

1. Write a program that asks a user to enter an integer n and then determines whether n is prime or not. Your program can perform this by dividing n by all integers from 2 to n-1 and by checking whether the remainder is 0.
2. Write a Java program to find GCD and LCM of two numbers (GCD is calculated using Euclidean Algorithm. LCM is found using factorization method.).
3. Write a program that computes C(n, k), i.e. the number of k-element subsets of a set with n elements. Remember that C(n, k) = n!/(k! (n-k)!) . Your program should ask the user to enter n and k, and compute and print C(n, k).
4. Write a Java program implement basic queue operations.
5. Write a Java program to count the frequency of words, characters in the given line of text.
6. Write a Java program that creates an object and initializes its data members using constructor. Use constructor overloading concept.
7. Write a Java Program to implement inheritance and demonstrate use of method overriding(example: Bank account/Employee)
8. Write a program to demonstrate use of user defined package by importing the package and access the member variable of classes contained in the package..
9. Write a program to demonstrate use of interfaces for two different classes. Interface should also include constants along with function prototypes.
10. Write a java program to implement exception handling using multiple catch statements. Also include code to identify the significance of finally block in handling exceptions.
11. Write a program to implement the concept of Exception Handling by creating user defined exceptions
12. Illustrate creation of thread by extending Thread class/ implementing runnable interface
13. Write a Java program that creates three threads. First thread displays "Good Morning" every one second, the second thread displays "Hello" every five seconds and the third thread displays "Welcome" every ten seconds.
14. Illustrate thread join concept.
15. Write a java program to implement mouse events like mouse pressed, mouse released and mouse moved by means of adapter classes.
16. Write a java program that creates a user interface to perform integer divisions. The user enters two numbers in the textfields, Num1 and Num2. The division of Num1 and Num2 is displayed in the Result field when the Divide button is clicked. If Num1 or Num2 were not an integer, the program would throw a NumberFormatException. If Num2 were Zero, the program would throw an ArithmeticException Display the exception in a message dialog box
17. Write a Java program to illustrate basic calculator using grid layout manager.
18. Develop an applet that receives an integer in one text field, and computes its factorial Value and returns it in another text field, when the button named "Compute" is clicked.
19. Write a java program to create student report using applet, read the input using text boxes and display the o/p using buttons.
20. Build a Java application for playing the tic-tac-toe game. Description of the game is available on http://en.wikipedia.org/wiki/Tic_tac_toe You are required to implement this game with two classes, TicTacToeGame and TicTacToeTester.

Suggested Networking Lab. Assignments

1. Write a networking program in Java to implement a TCP server that provides services for a TCP Client.
2. Write a networking program to implement socket programming using User datagram Protocol in Java.
3. Implement an FTP server using socket programming.
4. Implement a chat server using socket programming.
5. Implement an ECHO server using socket programming.
6. Implement Address Resolution Protocol using socket programming.
7. Implement Ping server and Ping client using socket programming. 8.Implement Single Window Protocol.
8. Implement Remote Command Execution using network programming.
9. Using Remote Method Invocation distribute the processing to three nodes.
10. Implement a program to retrieve the data for the specified URL.
11. Write a Java program to check whether the given DNS is found in the internet or not.
12. Write a network program using HTTP to print the document for the given URL.

CORE Electives

17MScCSCS 3.2	**Design and Analysis of Algorithms**	
Credits: 3	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   08Hrs
Notion of algorithm, Fundamentals of algorithmic problem solving, linear data structures, graphs, trees, sets and dictionaries. Analysis of algorithm efficiency: Analysis frame-work, asymptotic notations and basic efficiency classes, mathematical analysis of non-recursive and recursive algorithms, empirical analysis of algorithms.

UNIT II   10Hrs
Brute Force and Divide and Conquer- General method, Binary Search, Finding the maximum and minimum, merge sort, quick sort, Strassen's matrix multiplication, Decrease-and-Conquer and Transform-and-Conquer: Insertion sort, depth first search, topological sorting, presorting, Gaussian elimination, balanced search trees, heap sort, Horner's rule.

UNIT III   07Hrs
Greedy Method: General method, optimal storage on tapes, knapsack problem, job sequencing, Minimum Cost Spanning Trees- Prims's algorithm and Kruskal's algorithm, optimal storage on tapes, optimal merge patterns, single source shortest paths, Huffman trees.

UNIT IV   10Hrs
Dynamic Programming: General method, principle of optimality, multistage graphs, all pairs shortest paths, 0/1 knapsack, traveling salesman problem, Warshall's and Floyd's algorithms.

UNIT V   10Hrs
Backtracking: General method, 8-queen problem, sum of subsets, Hamiltonian cycles, traveling salesman problem. Branch and Bound : Introduction FIFO solution , LC branch and bound, Rat in

maze, TSP, Np completeness and approximation algorithm : Introduction, polynomial time, NP completeness and reducibility, approximation of algorithms.

References:

1. T. H Cormen, C E Leiserson, R L Rivest and C Stein, Introduction to Algorithms, 3rd Edition, Prentice-Hall of India
2. Mark A. Weiss, "Data structures and Algorithm analysis in C++(Java)", Fourth Edition, PHI.
3. Michael T.Goodrich, R.Tamassia and D.Mount, Data structures and Algorithms in C++, Wiley student edition, John Wiley and Sons.
4. Ellis Horowitz, Sartaj Sahani, Sanguthevar Rajashekaran, Fundamentals of Computer Algorithms, Universities Press, Second edition (2008).
5. Aho A.V., Hopcroft, J.E. and Ullaman, The Design and Analysis of Computer Algorithms, McGraw Hill

17MScCSCS 3.5	**b. .NET Technologies**	
Credits: 4	Teaching: 4Hrs/week	Max. Marks: 80
		IA: 20

UNIT I   08Hrs
Overview of Dynamic Web page, introduction & features of ASP.NET, Understanding ASP.NET Controls, Applications, Web servers, installation of IIS.
Web forms, web form controls -server controls, client controls.
Adding controls to a web form, Buttons, Text Box , Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project.
Form Validation: Client side validation, server Side validation, Validation Controls : Required Field Comparison Range. Calendar control, Ad rotator Control, Internet Explorer Control.

UNIT II   10Hrs
Overview of ADO.NET, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid.
XML in .NET , XML basics, attributes, fundamental XML classes: Document, textwriter, textreader. XML validations, XML in ADO.NET, The XMLDataDucument.

UNIT III   07Hrs
Web services: Introduction, State management- View state, Session state, Application state.
SOAP, web service description language, building & consuming a web service. Web Application deployment. Caching.

UNIT IV   10Hrs
Threading Concepts, Creating Threads in .NET, managing threads, Thread Synchronization
Security features of .NET, Role based security & Code access security, permissions

UNIT V   10Hrs
C# and .NET, similarities & differences from JAVA, structure of C# program. Language features: Type system, boxing and unboxing, flow controls, classes, interfaces, Serialization and Persistence, Serializing an Object, Deserializing an Object Delegates, Reflection.
VB and .NET, VB .NET features.

References:

1. Mathew Macdonald, The Complete Reference ASP.NET, TMH
2. Professional ASP.NET, Wrox Publication
3. Andrew Troelsen, Pro C# with .NET 3.0, Special Edition, Dream tech Press, India
4. Steven Holzner, VB.NET Programming Black Book, Dreamtech Publications.
5. Introduction to .NET framework, Wrox Publication
6. C# programming, Wrox Publications
7. Matt Telles, C# programming Black Book, Dreamtech Publications.
8. ASP.NET Unleashed, BPB publication

17MScCSCE 3.5	c. Internet of Things	
Credits: 3	Teaching: 4Hrs/week	Max. Marks: 80 IA: 20

UNIT I   06Hrs
Fundamentals of IoT: Introduction-Characteristics-Physical design - Protocols – Logical design – Enabling technologies – IoT Levels – Domain Specific IoTs – IoT vs M2M.

UNIT II   07Hrs
IoT Design Methodology: IoT systems management – IoT Design Methodology – Specifications Integration and Application Development.

UNIT III   12Hrs
Building IoT With Raspberry PI: Physical device – Raspberry Pi Interfaces – Programming – APIs / Packages – Web services –

UNIT IV   10Hrs
Building IoT with GALILEO/ARDUINO: Intel Galileo Gen2 with Arduino- Interfaces - Arduino IDE – Programming - APIs and Hacks

UNIT V   10Hrs
Case Studies and Advanced Topics: Various Real time applications of IoT- Connecting IoT to cloud – Cloud Storage for IoT – Data Analytics for IoT – Software & Management Tools for IoT

References:

1. Arshdeep Bahga, Vijay Madisetti, "Internet of Things – A hands-on approach", Universities Press, 2015.
2. Manoel Carlos Ramon, "Intel® Galileo and Intel® Galileo Gen 2: API Features and Arduino Projects for Linux Programmers", Apress, 2014.
3. Marco Schwartz, "Internet of Things with the Arduino Yun", Packt Publishing, 2014

17MScCSCE 3.5	**d. UNIX System Programming**	
Credits: 3	Teaching: 4Hrs/week	Max. Marks: 80
		IA: 20

UNIT I   08Hrs
UNIX and ANSI Standards: The ANSI C Standard, The POSIX Standards, The POSIX.1 Standards.
UNIX and POSIX APIs: The POSIX APIs, the UNIX and POSIX Development Environment, API Common Characteristics.

UNIT II   07Hrs
Files: File Types, The UNIX and POSIX File System, The UNIX and POSIX File Attributes, Inodes in UNIX System V, Application Program Interface to Files, UNIX Kernel Support for Files, Relationship of C Stream Pointers and File Descriptors, Directory Files, Hard and Symbolic Links.
File APIs: General File APIs (creat, open, write, read, close, fcntl), File and Record Locking, Directory File APIs, Device File APIs, FIFO File APIs, Symbolic Link File APIs, File Listing Program using APIs.

UNIT III   10Hrs
Processes: Introduction, Process Identifiers, fork, vfork, exit, wait, waitpid, waited, wait3, wait4 Functions, Race Conditions, exec Functions, Changing User IDs and Group IDs, Interpreter Files, System Function, Process Accounting, User Identification, Process Time
Process Relationships: Introduction, Terminal Logins, Network Logins, Process Groups, Sessions, Controlling Terminal, tcgetpgrp, tISEtpgrp, and tcgetsid Functions, Job Control, Shell Execution of Programs, Orphaned Process Groups.

UNIT IV   10Hrs
Signals: The UNIX Kernel Support for Signals, signal, Signal Mask, sigaction, The SIGCHLD Signal and the waitpid Function, The sigsetjmp and siglongjmp Functions, Kill, Alarm

UNIT V   10Hrs
Interprocess Communication: Introduction to IPC, Pipes, popen, pclose Functions, Coprocesses, FIFOs.
Advanced IPCs: Message Queues, Semaphores, Shared Memory

References:

1. W. Richard Stevens, Stephen A. Rago, Advanced Programming in the UNIX Environment, 2/e, Addison Wesley Professional.
2. Terrence Chan, Unix System Programming Using C++, Prentice Hall India
3. Marc J. Rochkind, Advanced Unix Programming, 2/e, Pearson Education.
4. Maurice. J.Bach, The Design of the UNIX Operating

Semester End Examination Question Paper Pattern

Max Marks: 80   Duration - 3 Hours.

Theory Question Paper Pattern

❖ There shall be eight questions of 16 marks each.

❖ Each question may have sub questions (a),(b) **/** (a),(b),(c)

❖ There shall be a minimum of one question from each unit

❖ There shall be not more than 2 questions from any unit.

❖ The student has to answer any five full questions for scoring full marks

Internal Assessment Scheme

Internal Assessment– 20 Marks:

IA Test   : 14 marks
Attendance   : 03 marks
Seminar/assignment   : 03 marks

Two tests shall be conducted, one during the mid of the semester and another at the end of the semester of 1hour duration each.
        First IA Marks   : 14
        Second IA Marks   : 14
Average of the two tests shall be taken as final marks.

Attendance Marks allocation scheme

Attendance (in percentage)	90 and above	80 and above but below 90	75 and above but below 80	below 75
Marks	3	2	1	no Marks*

 *not eligible for appearing semester end examination (as per Regulation 7.7)

Note: Guidelines notified by the University from time-to-time shall be followed for IA.