WITH EFFECT FROM THE ACADEMIC YEAR 2015-2016

SCHEME OF INSTRUCTION AND EXAMINATION
M.Sc.(IS) IInd YEAR

FACULTY OF INFORMATION SYSTEMS

SEMESTER – I

SI No.	Syllabus Ref. No.	Subject	Scheme of Instruction			Scheme of Examination		
			Periods per week			Duration in hrs	Maximum Marks	
			L	T	P		Univ. Exam	Sessionals
		THEORY						
1.	IS 501	Digital Logic and Embedded Systems	3	1	-	3	80	20
2.	IS 502	Big Data	3	1	-	3	80	20
3.	IS 503	Formal Languages and Compiling Techniques	3	1	-	3	80	20
4.	IS 504	Cloud Computing	3	1	-	3	80	20
		Elective – II (One of the following)						
5.	IS 511	Human Computer Interaction	3	1	-	3	80	20
6.	IS 512	Enterprise Application Integration						
7.	IS 513	Production and Operations Management						
		PRACTICALS						
6.	IS 531	Big Data Lab	-	-	3	3	50	25
7.	IS 532	Embedded Systems Lab	-	-	3	3	50	25
8.	IS 533	Soft Skills - III	-	-	3	3	50	25
TOTAL			15	5	9		550	175

WITH EFFECT FROM THE ACADEMIC YEAR 2015-2016

SCHEME OF INSTRUCTION AND EXAMINATION
M.Sc.(IS) IInd YEAR

FACULTY OF INFORMATION SYSTEMS

SEMESTER – II

SI. No	Syllabus Ref. No	Subject	Scheme of Instruction			Scheme of Examination		
			Periods per week			Duration in hrs	Maximum Marks	
			L	T	P		Univ. Exam	Sessionals
1.	IS 551	Main Project	-	-	6	-	Viva	100
2.	IS 552	Seminar	-	-	3	-	-	25

***Excellent/Very Good/ Good/ Satisfactory/ Unsatisfactory**

L - Lecture periods T- Tutorials P- Practical's

- Projects are evaluated with Viva Voce examination and the following grades are awarded:

  Excellent/Very Good/Good/Satisfactory/ Not Satisfactory

  In case of Not Satisfactory, the candidates has to redo the project and submit at the time of next semester examination.

IS 501 DIGITAL LOGIC AND EMBEDDED SYSTEMS

Instruction per week : 4Hrs Sessionals:20
Duration of Examination : 3 Hrs Univ.Exam:80

UNIT -I

Design Concepts-Digital Hardware, design process, design of digital hardware Introduction to logic circuits - Boolean Algebra, Gates, CAD tools

VHDL Implementation Technologies - NMOS, CMOS, PLDs, practical aspects, transmission gates, Implementation of PLDs and FPGAs

UNIT-II

Optimized implementation of logic functions- Karnaugh map, strategy, minimization of product of sums, NAND and NOR gates, Multilevel Synthesis, Cubical representations and minimization using cubical representation, CAD tools. Design of arithmetic circuits using CAD tools.

Combinational Building blocks - Multiplexers, decoders, encoders, code converters, VHDL for combinational circuits.

Latches-Basic. Gated SR, Gated D; Flip flops- D.T, and JK, Registers, Counters, using CAD tools.

UNIT -III

Synchronous sequential circuits - Basic design, state assignment, Me lay state model, design of finite state machines using CAD tools, State minimization, counter using sequential circuit, FSM as arbiter circuit, analysis, ASM charts.

Asynchronous sequential circuits - behavior, analysis, synthesis, state assignment, hazards.

Digital System design - Building block circuits, design examples, clock synchronization, Testing.

UNIT-IV

General Purpose processors software - Basic architecture, operation, programmers view, development environments, ASIPs.

Standard single purpose processor - introduction, timers, UARTs, PWM, LCD controller, keypad controller, stepper motor controller. *A/D* converter.

Memory - Introduction, Common Memory types.

Interfacing - Communication basics. I/O Addressing, Interrupts, DMA, Arbitration, Advanced communication principles, Serial protocols, Parallel protocols, wireless protocols.

UNIT - V

State Machine and concurrent process models - Models, Languages, FSMD. Using state machines, HCFSM, PSM, Concurrent Process model- Processes, communication synchronization, implementation. ' , ,

Control Systems - Open loop, closed loop, PID controllers, practical issues, benefits

IC Technology - VLSI, ASIC.

Design Technology - Automation: Synthesis, Verification, reuse.

Suggested Reading:

1. Stephen Brown, Zvonko Vranesic - "Fundamentals of Digital logic with VHDL design", McGraw 2000.
2. Frank Vahid, Tony Givargis - "Embedded System Design - A Unified Hardware / Software Introduction", John Wiley, 2002.

IS 502 **BIG DATA**

Instruction per week : 4Hrs Sessionals:20
Duration of Examination : 3 Hrs Univ.Exam:80

UNIT-I

Overview: Big Data, History of Data Management – Evolution of Big Data, Structuring Big Data, Types of Data, Elements of Big Data, Big Data Analytics, Advantages of Big Data Analytics, Future of Big Data

Exploring the Use of Big Data in Business Context: Social Networking, Preventing Fraudulent Activities, Detecting Fraudulent Activities in Insurance Sector, Retail Industry

Introducing Technologies for Handling Big Data: Distributed and Parallel Computing, Hadoop, Cloud Computing and Big Data, In-Memory Computing Technology for Big Data

UNIT-II

Hadoop: Hadoop Ecosystem, Hadoop Distributed File System, Map Reduce, Hadoop YARN, H Base, Hive, Pig and Pig Latin, Scoop, Zookeeper, Flume, Oozier

Map Reduce Fundamentals: The Map Reduce Framework, Techniques to Optimize Map Reduce Jobs, Uses of Map Reduce

Big Data Technology Foundations: Exploring the Big Data Stack, Virtualization and Big Data, Virtualization Approaches

Storing Data in Hadoop: Introducing HDFS, Introducing H Base, Combining H Base and HDFS Selecting the Suitable Hadoop Data Organization for Applications

UNIT-III

Processing Your Data with Map Reduce: Concept of Map Reduce Framework, Developing Simple Map Reduce Application, Points to Consider while Designing Map Reduce

Customizing Map Reduce Execution: Controlling Map Reduce Execution with Input Format, Reading Data with Custom Record Reader, Organizing Output Data with Output Formats, Customizing Data with Record Writer, Optimizing Map Reduce Execution with Combiner, Controlling Reducer Execution with Partitioners

Exploring Hive: Introducing Hive, Getting Started with Hive, Data Types in Hive, Built-In Functions in Hive, Hive DDL, Data Manipulation in Hive, Data Retrieval Queries, Using JOINS in Hive

Analyzing Data with Pig: Introducing Pig, Running Pig, Getting Started with Pig Latin, Working with Operators in Pig, Working with Functions in Pig

UNIT-IV

Storing Data in Databases and Data Warehouses: RDBMS and Big Data, Non-Relational Database, Polyglot Persistence, Integrating Big Data with Traditional Data Warehouses, Big Data Analysis and Data Warehouse, Changing Deployment Models in Big Data Era

No SQL Data Management: Introduction to No SQL, Aggregate Data Models, Key Value Data Model, Document Databases, Relationships, Graph Databases, Schema-Less Databases, Materialized Views, Distribution Models, Shading, Map Reduce Partitioning and Combining, Composing Map Reduce Calculations

Analytics and Big Data: Comparing Reporting and Analysis, Types of Analytics, Points to Consider during Analysis, Developing an Analytic Team, Understanding Text Analytics
Analytical Approaches and Tools to Analyze Data: Analytical Approaches, History of Analytical Tools, Introducing Popular Analytical Tools, Comparing Various Analytical Tools

UNIT-V
Data Visualization: Introducing Data Visualization, Techniques Used for Visual Data Representation, Types of Data Visualization, Applications of Data Visualization, Visualizing Big Data, Tools Used in Data Visualization
Social Media Analytics and Text Mining: Introducing Social Media, Introducing Key Elements of Social Media, Introducing Text Mining, Understanding Text Mining Process, Sentiment Analysis Performing Social Media Analytics and Opinion Mining on Tweets
Mobile Analytics: Introducing Mobile Analytics, Introducing Mobile Analytics Tools, Performing Mobile Analytics, Challenges of Mobile Analytics

Suggested Reading:

1. DT Editorial Services, Big Data Black Book, Dream Tech Press, 2015
2. Tom White, Hadoop: The Definitive Guide, O Reily, 4th Edition, 2015
3. Alex Homes, Hadoop in Practice, Manning Publications Co, 2012
4. Jimmy Lin, Chris Dyer, Data-Intensive Text Processing with Map Reduce, Morgan Claypool Publishers. 2010

IS 503 FORMAL LANGUAGES AND COMPILING TECHNIQUES

Instruction per week : 4Hrs Sessionals:20
Duration of Examination : 3 Hrs Univ.Exam:80

UNIT - I

Theory of computation – Introduction basic concepts.

Finite Automata - DFA, NFA, Regular languages and regular grammars - Regular expressions, connection between regular expressions and regular languages, regular grammars, Closure properties of regular languages.

UNIT-II

Context - Free Languages- CFG, Parsing and ambiguity, context free grammars and programming languages.

Simplification of context free grammars - Methods, normal forms. Push-down automata -Non-deterministic push down automata, PDA and CFG Pumping Lemmas, Introduction to Turing machine.

UNIT-III

Compiler - Introduction, Phases of compiler.

Lexical Analysis - role, specification of tokens, recognition of tokens, LEX.

UNIT-IV

Syntax Analysis - role of parser, Top-down parsing, Bottom-up parsing, YACC, Symbol Table organization.

UNIT - V

Semantic Analysis, Code generation, Code Optimization.

Suggested Reading:

1. Peter Linz, "An Introduction to Formal Languages and Automata", Narosa, 2001.
2. J.P. Bennett, " Introduction to Compiling Techniques", McGraw Hill, 1996.
3. Aho & Uliman, Compiler Design

IS 504 **CLOUD COMPUTING**

Instruction per week : 4Hrs Sessionals:20
Duration of Examination : 3 Hrs Univ.Exam:80

UNIT-I

Overview of Cloud Computing: Introduction to Cloud Computing, Need and Motivation of Cloud computing, System Models for Distributed and Cloud Computing, Roots of Cloud Computing, Grid and Cloud, Layers and Types of Clouds, Desired Features of a Cloud, Basic Principles of Cloud Computing, Challenges and Risks, Service Models.

UNIT-II

Virtualization: Introduction to virtualization, Virtual Machines and Virtualization of Clusters and Data Centers, Levels of Virtualization, Virtualization Structures / tools and Mechanisms, Virtualization of CPU, Memory and I/O Devices, Virtual Clusters and Resource Management, Virtualization Data-Center Automation.

Case Studies: Xen Virtual machine monitors – Xen API. VMware – VMware products – VMware features. Microsoft Virtual Server – Features of Microsoft Virtual Server.

UNIT-III

Cloud computing architectures over Virtualized Data Centers: Data–Center design and Interconnection networks, Architectural Design of Compute and Storage Clouds, Public Cloud Platforms, GAE, AWS, Azure, Inter-cloud Resource Management.

UNIT-IV

Cloud Security and Trust Management, data Security in the Cloud: An Introduction to the Idea of Data Security, The Current State of Data Security in the Cloud, **CryptDb**: Onion Encryption layers – DET, RND, OPE, JOIN, SEARCH, HOM and Homomorphic Encryption, FPE. Trust, Reputation and Security Management.

UNIT-V

Cloud Programming and Software Environments: Features of Cloud and Grid Platforms, parallel and distributed Programming Paradigms, Overview of Hadoop, Map Reduce and MPI, Programming Support of Google App Engine, Programming on Amazon AWs and Microsoft Azure, Emerging Cloud Software Environments.

Common Standards in Cloud Computing: The Open Cloud Consortium, the Distributed Management Task Force, Standards for Application Developers, Standards for Messaging. Internet Messaging Access Protocol (IMAP), Standards for Security, Examples of End-User Access to Cloud Computing.

Suggested Reading:

1. John W. Ritting House, James F. Ran Some, "Cloud Computing: Implementation, Management, and Security ", CRC Press 2009.
2. Kai Hwang, Geoffrey C. Fox, Jack J. Dongarra, “Distributed and Cloud Computing From Parallel Processing to the Internet of Things”, Elsevier, 2012.
3. Rajkumar Buyya, James Broberg and Andrzej M. Goscinski,” Cloud Computing: Principles and Paradigms (Wiley Series on Parallel and Distributed Computing), Wiley Publishing ©2011
4. Raluca Ada Popa, Catherine M. S. Redfield, Nickolai Zeldovich and Hari Balakrishnana, “Crypt DB: Protecting Confidentiality with Encrypted Query Processing” 23rd ACM Symposium on Operating Systems Principles (SOSP 2011), Cascais, Portugal October 2011.
5. Craig Gentry, A Fully Homomorphic Encryption Scheme, September 2009.
6. David Marshall, Wade A. Reynolds, "Advanced Server Virtualization: VMware and Microsoft Platform in the Virtual Data Center", Auerbach Publications, 2006.

Web resources:

1. http://aws.amazon.com/
2. http://code.google.com/appsengine
3. http://www.buyya.com/

Elective – II
(Any one of the following)

IS 511 HUMAN COMPUTER INTERACTION

Instruction per week : 4Hrs Sessionals:20
Duration of Examination : 3 Hrs Univ.Exam:80

UNIT- I
Importance of the user interface. Characteristics of graphical and web user interfaces, User Interface **Design Process:** Knowing the client, Understanding business function, Principles of good screen design.

UNIT-II
System Menus and Navigation Schemes, Kinds of windows, Device based controls, Screen based controls, Test and Messages.

UNIT- III
Feedback, Guidance and assistance. Internationalization and accessibility, graphics, icons and images, colours, Layout windows and pages.

UNIT- IV
Interaction Design: Introduction, Goals, Usability, Conceptualization interaction: Problem space, Conceptual models, Interface metaphors, Interaction paradigms, **Cognition:** Conceptual frameworks for cognition. **Collaboration and Communication:** Social mechanism, Conceptual framework.

UNIT- V
Affective aspects, Expressive interface, User frustration, Agents, Process of interaction design, Activities characteristics, Practical issues, Life cycle models, **Design:** Prototyping and construction, Prototyping, conceptual design, **Physical design Evaluation:** Introduction, Framework, **Testing and modelling users:** Kinds of tests ,Doing user testing, Experiments, Predictive models.

Suggested Reading:
1. Wilbert O. Galitz, The Essential Guide to User Interface Design, Wiley Dream tech 2002.
2. Sharp, Rogers, Preece, Interaction Design, John Wiley, 2007.
3. Andrew Sears, Julie A Jacko, Human, Computer Interaction Fundamentals, CRC Press, 2009.
4. Dan R Oslen, Human, Computer Interaction, Cengage Learning, 2010.

With effect from the academic year 2015-2016

IS 512 ENTERPRISE APPLICATION INTEGRATION

Instruction per week : 4Hrs Sessionals:20
Duration of Examination : 3 Hrs Univ.Exam:80

UNIT – I

Application Integration - Need, issues. Data level integration. Application Interface level integration. Method level integration.

UNIT-II

User interface level integration, EAI process. **Middleware –** Models, Transaction, RPC, MOM, Distributed objects, Database oriented Middleware.

UNIT-III

Enterprise Integration Design objectives. **Enterprise architecture -**General characteristics, Business Systems hierarchy, **Integration infrastructure-** Network, workflow. Business Systems Domain Enterprise Data:s Tonge, knowledge access. **F_tal1Jjsl:** ting Enterprise infrastructure Busin; >.ss **System Domain** - characteristics, components, Application lie sign issues. !" .

UNIT -IV

Message Infrastructure - Design Objectives, JMS, Design consideration Work Flow Introduction, process design considerations, Integration elements, scalability, product requirements, standards.
Web based user Access - environment. client facilities, server facilities, session management.
XML Integration - benefits, XML extended technology, impact.

UNIT - V

Component Technology - strategy, specifications**. Enterprise System security** - requirements, techniques, strategy. **Enterprise Intelligence** - Business requirements, architectural support.
Implementing architecture - Strategic pImming, changing user mind set, implementing infrastructure, managing infrastructure, setting application integration goals, managing application development, setting standards. managing change*r*- ,..."

Suggested Reading:

1. David S Linthicum, "Enterprise Application Integration", Addison, 2000.
2. Fred A Cummins, "Enterprise Integration", John Wiley, 2002.

IS 513 PRODUCTION AND OPERATIONS MANAGEMENT

Instruction per Week: 4 Hrs Sessionals: 20
Duration of Examination: 3 Hrs Univ. Exam. :80

UNIT-1

Introduction to production and operations management : Definition of production and operation management, evolution of production management as operation management. Role of operation management in total management system. Interface between the operation system and systems of other functional areas.

UNIT – II

Production planning and control : Basic functions of production planning and control, production cycle- characteristics of process technologies. Project, job shop. Assembly and continuous inter relationship between product life cycle and process life cycle. Scheduling and control of production operation control procedures and devices. Product sequencing – Sequencing of products in multi product multi – stage situations – plant capacity and line balancing- pant layout- different types of layouts. Location and the factors influencing location.

UNIT- III

Maintenance Management : objectives – failure concept. Reliability, preventive and breakdown maintenance, replacement policies and quality control – Standards and specifications. Quality assurance and quality circles – statistical quality control – control charts for average. Range faction defective and number of defects – total quality management. **ISO certification improvement of productivity :** work study, various techniques in the methods study for identifying the most appropriate method. Work measurement – its uses and different methods. Computation of allowance and allowed time.

UNIT-IV

Materials management: Need use and importance of material management – materials requirement planning- materials budgeting – Techniques for prioritization of materials – Sour of supply of materials – Selection. Evaluation and performance of suppliers- make or buy decisions and its implications under various circumstances – vendor rating – determinants of vendor rating.

UNIT- V

Stores management- Objectives of stores management – requirements for efficient management of stores – safety stock – inventory control – types of inventory. Costs – systems of inventory control – ABC, VED and FNSD analysis. Different systems if inventory control – value analysis – importance in cost reduction – concepts and procedures.

Suggested Reading:

1. Everett. Adam. Jr. and Ronald J. Elbert, “Production and Operations Management Concepts and Behavior”. Prentice Hall International Ltd. 1995.
2. Joseph G. Monks – “ Operations Management – Theory and Problems”. McGraw Hill. New York, 1987.
3. Hamid Noori and Russel Radford: “Production and Operation Managements – Total Quality and Responsiveness” McGraw Hills – 1995.

With effect from the academic year 2015-2016

IS 531 **BIG DATA LAB**

Instruction per week : 3Hrs Sessionals:25
Duration of Examination : 3 Hrs Univ.Exam:50

1. Install and Set up Hadoop
2. Work with basic HDFS Commands
3. Write Map Reduce program to count the occurrences of words in an input file
4. Write Map Reduce program to perform secondary sorting
5. Write Map Reduce Program that uses custom data types
6. Write Map Reduce Program to create custom partitioner class
7. Write Map Reduce Program to identify transactions performed on Sports Accessories data
8. Install and configure Hive
9. Write DDL, data manipulation, data retrieval queries in Hive
10. Install and configure Pig
11. Use operators and functions in Pig
12. Install and configure H base
13. Work with H base table commands

With effect from the academic year 2015-2016

IS 532 EMBEDDED SYSTEMS LAB

Instruction Per Week: 3hrs
Duration of Examination: 3hrs

Sessionals :25
Univ. Exam :50

Embedded Systems Practical involves development of an Application controller using either VHDL or a Micro Controller (such as 8051, z80).

Tools Required:

a) Xilinx ISE Tool / Max Plus synthesizer Tool
b) 8050 or z80 Emulator

Suggested Reading:

1. David E. Siman, " An Embedded Software Prime", Pearson Education 1999.
2. Myke Predko, " Programming and Customizing the 8051 Micro Controller " Tata McGraw Hill, 1999.
3. Mohammed Ali Mazidi, Janice Gillespie Mazidi, " 8051 Micro Controller and Embedded Systems", Pearson 2000.

With effect from the academic year 2015-2016

IS 533 **SOFT SKILLS - III**

Instruction per week : 3hrs Sessionals:25
Examination : Viva- voce

Mock Interview

Role Play

Public Speaking

Group Discussion

Team Work Ability

Semester – II

IS 551 **MAIN PROJECT**

Instruction	6 Periods per week
Duration of University Examination	Viva Voce
University Examination	Grade*****
Sessionals	25 Marks

Solving a real life problem should be the focus of U.G. projects. Faculty members should propose the projects (brief scope and references) well in advance which should be made available to the students at the department library. The project could be classified as hardware, software, modeling, simulation etc. The project should involve one or many elements of techniques such as analysis, design, synthesis.

The department will appoint a project coordinator who will coordinate the following:

Grouping of students (maximum of 3 in a group)
Allotment of projects and project guides
Project monitoring at regular intervals.

All projects allotment is to be completed by the 4^{th} week of 4^{th} year 1^{st} semester so that the students get sufficient time for completion of the project.

All projects will be monitored at least twice in a semester through student presentations. Sessional marks are to be based on the Grades/Marks, awarded by a monitoring committee comprising of faculty members as well as by the supervisor.

Efforts should be made that some of the projects are carried out in industries with the help of industry coordinators, Problems can also be invited from the industries to be worked out through U.G. projects.

Common norms will be established for the final documentation of the project report by the respective departments.

***Excellent / Very Good / Good / Satisfactory / Unsatisfactory**

Note: Three periods of contact load will be assigned to each project guide.

IS 552 **SEMINAR**

Instruction per week : 3Hrs Sessionals:25
Examination : Viva- voce

Each student will be required to:

1. Submit one page of synopsis on the project work for display on notice board.
2. Give a 20 minutes presentation followed by 10 minutes discussion.
3. Submit a technical write-up on the project.

At least two teachers will be associated with the Project Seminar to evaluate students for the award of Sessional marks which will be on the basis of performance in all the 3 items stated above.

The project seminar presentation should include the following components of the project:

- Problem definition and specification.
- Literature survey, familiarity with research journals.
- Broad knowledge of available techniques to solve a particular problem.
- Planning of the work, preparation of bar(activity) charts
- Presentation-oral and written.

.