2nd Year Master of Science (Computer Application) 2019-20

	Course Code	Title	Teaching per week		Course Credits	University Examination		Internal Marks	Total Marks
			Semester 3						
			Theory	Practical		Duration	Marks		
	301	Advance PHP Programming	4	0	4	3 Hrs	70	30	100
	302	Mobile Application Development	4	0	4	3 Hrs	70	30	100
	303	Software Testing / AI Modeling with Python	4	0	4	3 Hrs	70	30	100
	304	Elective 1	4	0	4	3 Hrs	70	30	100
	305	Elective 2	4	0	4	3 Hrs	70	30	100
	306	Practicals on Advanced PHP Programming	0	3	3	2 Hrs	70	30	100
	307	Practicals on Mobile Application Development	0	4	4	2 Hrs	70	30	100
	308	Practicals on Software Testing / Practicals on AI modeling with Python	0	3	3	2 Hrs	70	30	100
	TOTAL		20	10	30		560	240	800

Elective 1 and 2 are to be selected from the following papers:
  a) Cloud Computing
  b) Distributed Databases
  c) Multimedia Systems
  d) Advanced Artificial Intelligence
  e) Cyber Security and Forensics
  f) Search Engine Optimization

	Course Code	Title	Course Credits	University Marks	Internal Exam Marks	Total Marks	
			Semester 4				
	401	Project	24	280	120	400	
	402	Seminar	6	70	30	100	
	TOTAL		30	350	150	500	
	Program Passing Rules		As Per the University Norms of PG Rules				

Course : 301 : Advanced PHP Programming

Course Code	301
Course Title	Advanced PHP Programming
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	The purpose of the course is to make students capable of implementing concepts , methods and tool related to PHP for professional web application development , management and maintenance.
Course Objective	To Provide in-depth knowledge of most recent Open Source based server side programming technology.
Pr-requisite	Basic Understanding of Web, HTTP, HTML, Database Systems, Networks and Open Source Concepts
Course Out come	After completion of this course, the student will be capable to develop , manage and maintain professional web applications using PHP
Course Content	**Unit 1 PHP Programming Concepts** 　　1.1 Code structure and documentation 　　1.2 Array, Reference and Functions 　　1.3 Site structure and basics of web site development using PHP 　　1.4 PHP and OOP templates 　　1.5 Error Handling **Unit 2 Codeigniter Framework** 　　2.1 Introduction to Codeigniter: setup, Configuration files support, Application flow control and model-view-controller architecture 　　2.2 Codiginiter URL's , Helper's file and URI routing, Codeigniter in-built libraries, Common functions,Error Handling 　　2.3 OOP in Codeigniter 　　2.4 Working with forms and validations 　　2.5 Cookies and Session Management 　　2.6 Using built in helpers for Email and SMTP support **Unit 3 Accessing Database** 　　3.1 Accessing MySQL Database 　　　　3.1.1　Connecting to MySQL DB Engine and database 　　　　3.1.2　Executing queries and retrieving resultsets 　　　　3.2.3　Exporting data to CSV and Tab Delimited files 　　3.2 Working with SQLite 　　3.3 CRUD operations using Codeignitor **Unit 4 working with images, pdf files, Ajax and XML** 　　4.1 Working with images 　　　　4.1.1 Creating and manipulating images 　　　　4.1.2 Using Text in Images 　　　　4.1.3 Creating database driven graph 　　　　4.1.4 Saving and building on existing image.

	4.2 Generating PDF file with text, shapes and images.
	4.3 PHP with XML
	       4.3.1 XML Introduction
	       4.3.2 Generating XML Document
	       4.3.3 Parsing XML Document
	4.3 PHP with Ajax
	       4.4.1 Asynchronous JavaScript – AJAX
	       4.4.2 Client side HTML file and Serer side PHP file
	       4.4.3 Ajax Request and response.
	
	Unit 5 Web services in PHP
	       5.1 Creating web services
	       5.2 Discovering web service
	       5.3 Accessing web services.
	       5.4 API integration using third-party libraries in Codeignitor
	          (EX: Google Maps CI, LinkedIn API Wrapper , etc.)

Reference Book	1. Programming with Codeigniter MVC BY Eli Orr and Yehoda Zadik, Shroff publication, ISBN – 13:978-93-5110-330-1 2. Codeigniter 1.7 by Jose Argudo Blanco and David Upton Shroff publication ISBN – 13:978-81-8404-606-0 3. The complete reference – PHP by Steven Holzner Mc Graw Hill ISBN – 13:978-0-07-0223622 4. AJAX and PHP: Building Modern Web Applications by Cristian Darie Second edition Packt publishing, ISBN: 1904811825, 9781904811824 5. XML and PHP by Vikram Vaswani SAMS Publishing ISBN - 0735712271, 9780735712270 6. PHP Web Services APIs for the Modern Web By Lorna Jane Mitchell O'Reilly Media, ISBN: 978-1-4493-5656-9 | ISBN 10:1-4493-5656-7
Teaching Methodology	Discussion, Independent Study, Seminars / Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation,class test, quiz, assignment / seminar, internal examination etc. 70% assessment is based on end semester written examination

Course: 302: Mobile Application Development

Course Code	302
Course Title	Mobile Application Development
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2017
Purpose of Course	The purpose of the course is to make students capable of implementing concepts , methods and tool of mobile application development using Android for development , management and maintenance of mobile device based application.
Course Objective	To Provide in-depth knowledge of most recent Mobile Devices Application Development technology.
Pr-requisite	Basic Understanding Java Programming, Object Oriented Concepts and Networks.
Course Out come	After completion of this course, the student will be capable to develop, manage and maintain professional mobile applications using Android

Course Content	**Unit 1.Introduction To android**
	    1.1 Architecture Of Android OS and comparison with other mobile OSes
	    1.2 Types Of Android Application - Foreground Applications, Background Services, Intermittent Applications, Widgets & Containers.
	    1.3 Components Of Android Application - Activities, Services, Broadcast Receivers, Content Providers
	    1.4 Application Lifecycle, Priority and States
	    1.5 Android Activity- Activity Lifecycle and Activity Stack
	    1.6 Android Development Tools
	        1.6.1. Android SDK and SDK Manager
	        1.6.2. The Android Virtual Device, Emulator
	        1.6.3. Dalvik Debug Monitor Service (DDMS)
	        1.6.4. Android Debug Bridge (ADB)
	
	Unit 2. Programming with Android
	    2.1 Directory Structure of Android Application
	    2.2 Creating And Working with Android Activities
	    2.3 Application Manifest
	    2.4 Creating User Interface
	        2.4.1. Fundamental UI Design
	        2.4.2. Layouts and its attributes
	        2.4.3. Drawable Resources
	    2.5 Deploying Android Application
	
	Unit 3. Working with Data
	    3.1 Working with SqLite database
	    3.2 Shared Preferences-Creating, Saving, Retrieving Shared Preferences.
	    3.3 Creating and using Content Providers.
	
	Unit 4. Advanced Android Programming
	    4.1 Working with advanced UI controls
	        4.1.1 Working with Listviews - Simple Listview, Custom Listview
	        4.1.2. Working with Menus
	        4.1.3 Working with Dialog classes - Alert dialog, Specialist input dialog, Using Activities as dialogs.

	4.1.4 Working with Spinner, Progressbar, DatePicker and TimePicker 4.2 Working with Webview 4.3 Working with Intents-Intents, Linkify,Broadcast Receivers, Intent Filters **Unit 5. Working with other Resources** 5.1 Using Internet Resources, Services, Google App engine, Geocoder and Google Maps 5.2 Audio, Video and Using the Camera 5.2.1. Playing and recording Audio and Video 5.2.2. Working with the Camera
Reference Book	1. Professional Android 4 Application Development Reto Meier, WROX Publication-2015 2. Android for Programmers-An App Driven Approach, Deitel, Deitel, Deitel and Morgano, Pearson Publication-2012 3. Android Programming Unleashed, Harwani, Pearson Publication-2013 4. Professional Android Programming-with MONO McClure, Blevins, Croft, Dick and Hardy, Wiley India-2012 5. Android application development for java programmer, James C Sheusi, Cenage Learning-2013 6. Android Essentials, Chris Haseman, Apress Publication, 2009 7. Beginning Android, Mark L Murphy, Wiley India Pvt Ltd, 2009 8. Pro Android, Sayed Y Hashimi and Satya Komatineni, Wiley India Pvt Ltd, APress-2009
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course Code	303
Course Title	SOFTWARE TESTING
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2017
Purpose of Course	The course gives students an idea about Software Testing fundamentals and practice followed to test the software.
Course Objective	To Provide in-depth knowledge of most Software Testing and Industrial practices in it.
Pr-requisite	Basic Understanding of Programming and Software Engineering.
Course Out come	After completion of this course, the student will be capable of implementing the concepts, methods and tools of software testing.

Course Content	**Unit -1 Software Testing**
	
	1.1 Role and objective of Testing, Central Issue in Testing, Testing Activities
	1.2 Testing Approaches-Whitebox, Blackbox and Greybox
	1.3 Levels of testing : Unit, Integration, System and Acceptance
	
	Unit 2: Types of testings
	2.1 Code coverage-program statement and Line coverage, Branch coverage, condition Coverage, path coverage, function/procedure coverage
	2.2 Data Testing-Testing for Boundary conditions, Sub-Boundary conditions, Default, Empty, Null, Zero, None, Invalid, Wrong, Incorrect, Garbage Data
	2.3 Functional Testing:
	   2.3.1 Testing for Correctness, Completeness, Accuracy, Precision
	   2.3.2 Test to pass and test to fail
	2.4 Behavioral Testing: State based testing, Testing for Stress, Load, Performance, Security
	2.5 Regression testing, Smoke testing and Sanity Testing
	2.6 Basics of Usability Testing, Configuration Testing and Compatibility Testing
	2.7 Basics of Testing for Web & Mobile Applications
	
	Unit 3: Test Automation
	3.1 Manual Testing Vs. Automated Testing
	3.2 Criteria for Test Automation
	3.3 Tool Selection and Introduction criteria
	3.4 Cost Effectiveness of Tool Introduction
	3.5 Types of test tools
	   3.5.1 Requirements and basic characteristic of Tool for Test management and Control
	   3.5.2 Requirements and basic characteristic of Tool for Test Case Generation
	   3.5.3 Requirements and basic characteristic of Tool for Test Execution
	   3.5..4 Requirements and basic characteristic of Tool for Regression Testing

	Unit 4 Test Automation Tools
	    4.1 Unit Testing with NUnit
	        4.1.1 NUnit framework, Test Fixture, Test, Sepup & Tear Down,
	            Asserts and Exception
	        4.1.2 Writing and executing testcases with NUnit
	    4.2 Unit Testing with JUnit
	        4.2.1 JUnit framework, Test Fixture, TestCase, Sepup & Tear Down
	            Asserts and Exception
	        4.2.2 Writing and executing testcases with JUnit
	    4.3 Functional Web Testing Using Selenium
	        4.3.1 Creating, Saving and Exporting TestCases and TestSuites
	        4.3.2 Test recording and playback using Selenium
	        4.3.3 Fundamentals of Selenium commands, parameters, element
	            locators filters and string match patterns
	
	Unit 5: Other testing Tools
	    5.1 Test case generation Tool-case study of TestCaseGenerator
	    5.2 Tool for Bug Tracking- case study of Bugzilla
	    5.3 Tool for Test Management-case study of Tlink

Reference Book	1. Ron Patton "Software Testing", Techmedia Publication, 2000 2. Dr. K.V.K.K prasad, "Software Testing Tools", Dreamtech, 2006 3. Srinivas D and Gopalswamy R, "Software Testing: Principles and Practices". Pearson Education, 2013 4. Rajiv Chopra,"Software Testing- A Practical Approach", 5. K. Mustafa and R.A Khan, "Software Testing -concepts and practices", Narosa, 2012 6. Bill Hamilton, "NUnit: pocket Referance", SDP-OReilly, , 2004 7. Andrew Hunt and David Thomus, "Pragmatic Unit Testing in Java with JUnit", SPD, 2006 8. Aditya Garg and Ashish Mishra, "A Practitioner's Guide to Test Automation using Selenium", McGrawHill Education, 2015 9. S.A Kelkar, " Software Quality and Testing- A Concise Study",
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course Code	303
Course Title	**Modeling AI applications with Python**
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	-
Purpose of Course	The purpose of the course is to make students capable of implementing concepts , methods and tool related to python for modeling various AI applications.
Course Objective	◆ To learn Python programming and usage of various libraries ◆ To learn and implement Data processing and visualization routines ◆ To implement and evaluate various AI models in Python
Pr-requisite	Only those Students who have completed any one of the following courses can opt this course: 1)M.Sc(Comp. Appl). Sem-1- 101: Fundamentals of Artificial intelligence 2) M.Sc(Comp. Appl). Sem-II- 204: Datawarehousing and Data mining
Course Out come	After completion of this course, the student will be capable to model some AI applications using Python.

Course Content	**Unit 1 Python Programming Concepts**
	    1.1 Python's core philosophy
	    1.2 Working with Python
	        1.2.1 Jupiter Notebook, basic elements of Python, Objects, Expression and numerical types, Variables and Assignments, IDLE, Branching Programs, String Input, Iteration, Indentation
	        1.2.2 Operations on Structured Types-Tuples, Sequence, Lists, Range, Dictionaries
	    1.3 Functions, Exception and Modules- Difference between Function and Method, Defining Function, Calling Function, Exception handling
	
	Unit 2 Basic Python Libraries : Numpy and SciPy
	    2.1 Arrays and Vectorized Computation using NumPy
	        2.1.1 The NumPy ndarray: A Multidimensional Array Object
	        2.1.2 Universal Functions: Fast Element-wise Array Functions
	        2.1.3 Data Processing and File I/O with Arrays
	    2.2 Scientific Computing and technical computing using SciPy
	        2.2.1 File Input /Output : scipy.io
	        2.2.2 Special Functions : scipy.special
	        2.2.3 Linear Algebra operations: scipy.linalg
	        2.2.4 Optimize and Fit : scipy.optimize
	        2.2.5 Statistic and Random Numbers: scipy.stats
	
	Unit 3 Data Operations and Pre-Processing : Pandas and Matplotlib
	    3.1 Introduction to pandas Data Structures
	        3.2 Operations on Data
	        3.2.1 Reading and Writing Data in Text Format
	        3.2.2 Summarizing and Computing Descriptive Statistics
	        3.2.3 Handling Missing Data, Combining and Merging Data Sets, Reshaping and Pivoting, Data Transformation, String Manipulation
	    3.3 Plotting and Visualization
	        3.3.1 Fundamentals of Matplotlib API
	        3.3.2 Plotting Functions in Pandas
	Unit 4 Modeling AI Applications in Python
	        4.1 Quick overview of Supervised Learning- Classification and

	Regression, Generalization, Overfitting, and Underfitting, Relation of Model Complexity to Dataset Size
	4.2 Modeling Supervised Machine Learning - Modeling k-Nearest Neighbor model , Linear Models, Naive Bayes classifiers, Decision Tree based classifier
	4.3 Modeling Neural Networks
	       4.3.1 Defining ANN in Python - layers and Multilayer Perceptron, weights, bias, Activation Function, Loss function, Epochs
	       4.3.2 Training and testing Neural Network, Feed Forward Neural Network, Backpropagation Neural Network, Error calculation
	
	Unit 5 Model Evaluation and Improvement
	       5.1. Cross-Validation and its benefits
	          5.1.1. Cross-Validation in scikit-learn
	          5.1.2. Stratified k-Fold Cross-Validation and Other Strategies
	       5.2. Evaluation Metrics and Scoring
	          5.2.1. Keep the End Goal in Mind
	          5.2.2 Metrics for Binary Classification, Multiclass Classification, Regression Metrics
	          5.2.3. Using Evaluation Metrics in Model Selection

Reference Book	1. Core Python Programming – by Wesley J Chun
	   ISBN-13: 978-0132269933
	2. Python for Data Analysis Data Wrangling with Pandas, NumPy, and IPython , By William McKinney Publisher: O'Reilly Media
	3. Pandas Cookbook Paperback – by Theodore Petrou (Author)
	4. Python for Data Science for Dummies-By Mueller and Massaron, Wiley Publication
	5. Introduction to Machine Learning with Python by Sarah Guido, Andreas C. Müller Publisher: O'Reilly Media, Inc. ISBN: 9781449369880
	6. Machine Learning in Python-Michael Bowles, Wiley Publication
	7. Machine Learning (in Python and R) for Dummies- By Mueller and Massaron, Wiley Publication
	8. Python for Everybody: Exploring Data in Python 3, by Charles Severance (Author), Aimee Andrion (Illustrator), Elliott Hauser (Editor), Sue Blumenberg (Editor)
	9. An Introduction to Python - by van Rossum Guido
	   ISBN: 9780954161767, 0954161769
	10 Python for everybody, Charles, Serverance, SPD
	11. Python Programming using Problem Solving Approach-By Reema Thareja Oxford University Press
	12. Introduction to Computer Science using Python-Charles Dierbach, Wiley Publication

Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course Code	**ELECTIVE A**
Course Title	CLOUD COMPUTING
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2017
Purpose of Course	The course gives students an idea about Cloud Computing fundamentals and Cloud Based Systems.
Course Objective	To provide comprehensive knowledge of Cloud based systems and aspects related to it.
Pr-requisite	Basic Understanding of of Types and Categories of Information Systems, Web and Web based Application Development.
Course Out come	After completion of this course, the student will gain comprehensive knowledge of of Cloud based systems and aspects related to it.

Course Content	**Unit 1 Evolution of Cloud Computing**
	1.1 Introduction to Web 2.0 and Web 3.0
	1.2 Virtualization
	1.3 Moving towards Cloud Computing
	
	Unit 2 Fundamentals of Cloud
	2.1 Cloud characteristics-On Demand Service, Ubiquitous Network Access, Location Independent Resource Pooling, Rapid Elasticity.
	2.2 Cloud Benefits and Barriers
	2.3 Cloud Types-Public, Private, Hybrid, Community, Shared Private, Dedicated Private
	2.4 Security in public cloud - Multi-tenancy, Security Assessment, Shard Risk, Staff Security Screening, Distributed Data Centers, Physical Security, Policies, Coding, Data Leakage.
	2.5 Cloud Computing Essentials
	    2.5.1 Cloud Computing Architectural Framework
	    2.5.2 Cloud Deployment Models
	    2.5.3 Virtualization in Cloud Computing
	    2.5.4 Parallelization in Cloud Computing
	    2.5.5 Security for Cloud Computing
	
	Unit 3 Cloud Service Models
	3.1 Infrastructure as a Service
	    3.1.1 Server virtualization
	    3.1.2 Storage virtualization
	    3.1.3 Network virtualization
	3.2 Platform as a Service (PaaS)
	    3.2.1 Azure
	    3.2.2 Goole AppEng
	    3.2.3 Hadoop
	    3.2.4 SalesForce
	3.3 Software as a Service (SaaS)-Characteristics, Open SaaS and SOA
	    3.3.1 Cloud services
	    3.3.2. Web portal
	    3.3.3. Web OS
	3.4 Identity as a Service(IDaaS)
	    3.4.1 Network Identity Service Classes
	    3.4.2 IDaaS Interoperability-user authentication, Authorization MarkUp Languages
	3.5 Compliance as a Service(CaaS)

	Unit 4 Cloud Based Systems
	    4.1. Cloud Based Storage
	        4.1.1 Provisioning Cloud Storage - Unmanaged and Managed cloud
	            storage, creating cloud storage systems, virtual storage containers.
	        4.1.2 Cloud Backup solutions-types, features, cloud attached backups.
	        4.1.3 Cloud storage Interoperability- Cloud Data Management
	            Interface(CDMI), Open cloud Computing Interface(OCCI)
	    4.2. Cloud Based Productivity Software
	        4.2.1 Productivity applications and Characteristics
	        4.2.2 Online Office systems- Acrobat.com, Google Docs,
	            Microsoft Office Web apps etc.
	    4.3. Cloud based Webmail Services
	        4.3.1 Cloud Mail Services-Google Gmail, Windows Live Hotmail,
	            Yahoo! Mail, Mail2Web.
	        4.3.2 Syndication services- RSS an Atom protocols,
	            NewsReaders, News aggregators
	    4.4. Cloud based Communicating systems
	        4.4.1 Instant Messaging clients, Interoperability, Micro-blogs or
	            Short Message Services
	        4.4.2 Collaboration Technologies
	        4.4.3 Social Networks for communication
	    4.5. Cloud based Media and Streaming
	        4.5.1 Introduction to Streaming Process and Protocols
	        4.5.2 Audio Streaming , VoIP applications-Skype, Google Voice,
	            Google Talk
	        4.5.3 Video Streaming formats, Television based streaming, Youtube.
	
	Unit 5 Mobile Cloud
	    5.1. Using Smartphones with the cloud
	    5.2.Mobile Interoperability
	    5.3. Performing Service Discovery
	        5.3.1 Context Aware Services
	        5.3.2 MEMS
	        5.3.3 Location awareness
	        5.3.4 Push services
	    5.4. Short Message Service(SMS)
	    5.5.WAP and Other Protocols
	    5.6. Performance synchronization

Reference Book	1.Cloud Computing: Principles and Paradigms - R. Buyya et al - Wiley 2010
	2.Cloud Computing : Principles Systems and Application - L Gillam et al -
	  Springer 2010
	3.Cloud Computing Bible - Sosinsky - Wiley - India, 2011
	4.Cloud Computing Second Edition Dr. Kumar Saurabh - Wiley - India, 2012
	5.Service Oriented Architeture: Concepts , Technology and Design -
	  Thomas Erl - Prentice Hall publication, 2005
	6.Understanding Enterprise SOA - Enterprise Service Oriented Architecture
	  - Eric Pulier, Hugh Taylor - Dreamtech Press 2008
	7.Cloud Computing - Insight into New Era Infrastructure - Dr Kumar Saurabh -
	  Wiley India 2012
	8.Understanding SOA with Web Services - Sanjiva Weerawarana,
	   Franscisco Cubera, Frank Leymann, Tony Storey, Donald F Ferguson,
	   Eric Newcomer, Greg Lomow - Addision Wesely Publication, 2004
	9.Enterprise Service Bus - Dave Chappelll - O'Reilly Publications 2004

Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course Code	ELECTIVE B
Course Title	DISTRIBUTED DATABASE MANAGEMENT SYSTEM
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2015
Purpose of Course	The course gives students an idea about Distributed Database System and Query processing in Distributed Database System.
Course Objective	To provide comprehensive knowledge of Distributed Database Systems and aspect related to it.
Pre-requisite	Deep understanding of Database Management System concepts, Database Design, Database Management, Database Storage, Querying and Query Processing, Query Evaluation and Optimization and Object Oriented Concepts.
Course Out come	After completion of this course, the student will gain comprehensive knowledge of Distributed Database Systems and aspects related to it.

Course Content	**Unit 1 Introduction to Distributed database Management System**
	    1.1 Distributed data processing, What is a DDBMS?
	    1.2 Advantages and disadvantages of DDBMS.
	    1.3 Problem areas, Overview of database and computer network concepts
	    1.4 Architecture
	    1.5 Transparencies in a distributed DBMS
	    1.6 Distributed DBMS architecture Global directory issues
	Unit 2 Distributed Database Design
	    2.1 Alternative design strategies
	    2.2 Distributed design issues
	    2.3 Fragmentation, Data allocation
	Unit 3 Query Processing Issues & query optimization in distributed databases
	    3.1 Objectives of query processing, Characterization of query processors
	    3.2 Layers of query processing, Query decomposition
	    3.3 Localization of distributed data
	    3.4 Factors governing query optimization
	    3.5 Centralized query optimization, Ordering of fragment queries
	    3.6 Distributed query optimization algorithms
	Unit 4 Distributed Object Management and query processing
	    4.1 Object model features
	    4.2 Fundamental object management issues
	    4.3 DOM architectures
	    4.4 Object caching, Object clustering, Object migration
	    4.5 Distributed object base systems
	    4.6 Problems in accessing distributed objects
	    4.7 Goals of Distributed object assembly problem
	    4.8 Strategies for distributed object assembly

	Unit 5 Transaction Management in Distributed Databases **5.1** The concept of 'transaction' **5.2** Goals of transaction management, Characteristics of transactions **5.3** Taxonomy of transaction models
Reference Book	1. Principles of Distributed Database Systems - M.T. Özsu and P Valduriez – Prentice-Hall 2. Principles of Distributed Database Systems, 3rd edition - M.T. Özsu and P Valduriez – Springer , 2011 . 3. Distributed Object Management By Morgan Kaufman - M.T. Özsu and P Valduriez (editor) - 4. Distributed Databases Principles and Systems – S. Ceri and G.Pelagatti – Macgraw Hill Book Company ISBN : 5. Oracle 9i Distributed Database Replication Manual Mordern Database systems. 6. The Object Model Interoperability and Beyond - W.KIM(editor) – APRESS 7. Advances in Object-Oriented Database Systems – A.Dogac, M.T Ozsu, A Billiris and T.Sellis (editors) - Springer –Verlag 8. Object Oriented Database System – Approaches & Architectures - C.S.R PRABHU - PHE Pub. 9. Fundamental of Database Systems 3rd edition – Elinisky & Navathe – Addison Welsey 10. Database Management Systems – Raghu Ramkrishnana and Johannes Gehrke – McGraw Pub.
Teaching Methodology	Discussion, Independent Study, Seminars / Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course : Elective -C MULTIMEDIA SYSTEMS

Course Code	ELECTIVE C
Course Title	MULTIMEDIA SYSTEMS
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2015
Purpose of Course	The course gives students an idea about Multimedia Systems .
Course Objective	The aim of this course is to provide knowledge of the basic concepts and techniques related to Multimedia System
Pre-requisite	Students should be familiar with basics of computer graphics and multimedia..
Course Out come	After completion of this course, the student will gain knowledge of basic concepts and techniques related to Multimedia System

Course Content	**1. Computer graphics**
	  1.1 Fundamentals
	  1.2 Vector graphics
	  1.3 Shapes
	  1.4 Transformations and Filters
	  1.5 3-D Graphics
	  1.6 Bitmapped graphics
	  1.7 Resolution
	  1.8 Image Manipulation
	  1.9 Geometrical Transformation
	  1.10 Combining Vectors and Bitmaps
	  1.11 File Formats
	
	2. Video & Animation
	  2.1 Digitizing Video
	  2.2 Video Standards
	  2.3 Video Compression techniques
	  2.4 Digital Video Editing and Post-Production
	  2.5 Streamed Video and Video Conferencing
	  2.6 Captured Animation and Image Sequences
	  2.7 'Digital Cel' and Sprite Animation
	  2.8 Key Frame Animation
	  2.9 3-D Animation
	
	3. Sound
	  3.1. The Nature of Sound
	  3.2. Digitizing Sound
	  3.3. Processing Sound
	  3.4. 4.4 Compression
	  3.5. Formats
	  3.6. MIDI
	  3.7. Combining Sound and Picture

	4. Distributed Multimedia system 　4.1. Operating System Introduction to DMS 　4.2. Main Features of DMS 　4.3. Resources Management of DMS 　4.4. Networking 　4.5. Multimedia 　4.6. Distributed Multimedia Servers 　4.7. Distributed Multimedia Application **5. Multimedia Data Compression** 　5.1 Data Compression Terminology 　5.2 A Classification of Data Compression Terminology 　5.3 Data Compression Technology 　5.4 Compression Standards 　5.5 Image Compression 　5.6 Video compression 　5.7 Audio compression
Reference Book	1. Digital multimedia 3/e illustrated – Chapman, Nigel P. Chapman, Jenny Chapman – Wiley , 2009 2. Multimedia – Making it Work – Tay Vaudhan　Tata Mcgraw Hill ISBN 3. Streaming Multimedia – Steve Mack - John Wiley 4. Multimedia Communication System - LPE Pearon – Education Publication.
Teaching Methodology	Discussion, Independent Study, Seminars /Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course Code	ELECTIVE D
Course Title	Advanced Artificial Intelligence
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	--
Purpose of Course	The course gives students advanced knowledge of AI systems and applications
Course Objective	◆ To learn and understand AI and Expert systems ◆ To learn and understand AI in Natural language processing & Translation ◆ To learn and understand AI for Computer Vision and Robotics
Pre-requisite	Only those Students who have completed the following course can opt this course: 1) M.Sc(Comp. Appl). Sem-1- 101: Fundamentals of Artificial intelligence
Course Out come	After completion of this course, the student will gain knowledge of AI systems and applications like Expert Systems, Natural Language Processing, Computer Vision and Robotics

Course Content	**Unit 1: Expert Systems**
	  1.1 Overview of Expert System, Characteristics, Development of Expert System and Technology, Domains and applications, Elements of an Expert System, Production system, Artificial Neural System
	  1.2 Design of Expert System - Stages in development of an Expert System, Software Engineering and Expert System, The Expert System Life Cycle, Expert System Life Cycle Model,
	  1.3 Expert System Architecture - Overview of expert System Tools, Expert System Shells, Black Board Architecture, Truth Maintenance Architecture System, Rule Induction by Machine Learning
	Unit 2: Natural language processing
	  2.1 Introduction - Communication as action, fundamentals of language, the component steps of communication,
	  2.2 Language Models - *N gram* character models, model smoothing, model evaluation, *N gram* word models
	  2.3 Text Classification
	  2.4 Information Retrieval - IR scoring functions, IR system evaluations, IR refinements, The PAGERANK algorithm,The HITS algorithm, Question answering
	  2.5 Information Extraction - Finite state automata for IE, Probabilistic models for IE, Conditional Random fields for IE, Ontology extraction from large corpora, Automated template construction, Machine Reading
	Unit 3: Natural language for Communication
	  3.1 Introduction - Communication as action, fundamentals of language, Grammar Formal isms and their generative capacity,the component steps of communication,
	  3.2 Phrase structure Grammars - The lexicon of E0, The grammar of E0,
	  3.3 Syntactic Analysis(Parsing) - CYK algorithm, Learning probabilities for PCFGs
	  3.4 Augmented Grammars and Semantic Interpretation - Lexicalized PCFGs, Augmented Grammar Rules, Case agreement and subject-verb agreement, Semantic interpretation, Complications in grammar of real English
	  3.5 Machine Translation-machine translation systems, Statistical machine translation,
	  3.6 Speech Recognition - Acoustic model, Language model, Building a

	speech recognizer

	Unit 4. Perception
	    4.1 Image Formation-The pinhole camera, Lens systems, Scaled
	         Orthographic projection, Light and Shading, Color
	    4.2 Early Image-Processing Operations - Smoothing, Edge detection,
	         Texture, Optical flow, Image segmentation
	    4.3 Object Recognition by Appearance-Complex appearance and pattern
	         elements, pedestrian detection with HOG features
	    4.4 Reconstructing the 3D World - Motion parallax, Binocular stereopsis,
	         Multiple views, Texture, Shading, Contour, Objects and geometric
	         structures of scenes
	    4.5 Object Recognition from Structural Information - The geometry of
	         bodies, Coherent appearance
	    4.6 Using Vision- The problem of image tagging/annotation,
	         Reconstruction from many views, Using vision for controlling
	         movement
	  5. Robotics
	    5.1 Introduction
	    5.2 Robot Hardware-Sensors, Effectors
	    5.3 Robotic Perception - The problems of state estimation, Localization
	         and mapping, other types of perceptions, machine learning in robot
	         perception,
	    5.4 Planning to Move - Configuration space, Cell decomposition
	         methods, Modified cost functions, Skeletonization methods,
	    5.5 Planning Uncertain Movements- Robust methods
	    5.6 Moving - Dynamics and control, Potential field control, Reactive
	         control, Reinforcement learning control,
	    5.7 Robotic Software Architectures - Subsumption architecture, Three-
	         layer architecture, Pipeline architecture
	    5.8 Application Domains of robotics

Reference Book	1. Artificial Intelligence –A Modern Approach (2nd Edition/ 3rd Edition)
	   - by Stuart J. Russell and Peter Norvig, Pearson Education
	2. Artificial Intelligence-Building Intelligent Systems- By Kulkarni and Joshi, PHI
	3. Artificial Intelligence - By Anamitra Deshmukh-Nimbalkar and
	   Manmohan Singh, Technical Publications
	4. Introduction to AI Robotics - By Robin Murphy, PHI
	5. Natural Language Processing and Information Retrieval-By bSiddiqui and
	   Tiwari, Oxford University Press
	6. Speech and Language Processing - By Jurafsky and Martin, Pearson Education
	7. Introduction to Artificial Intelligence and Expert Systems – Dan W.
	   Patterson –PHI
	8. Foundation of Artificial Intelligence and Expert Systems – By V.S
	        Janakriraman, K.Sarukesiand P.Gopalkrishnan – Macmilan
	9. Expert Systems : Principles and Programming – By Joseph C Giarratano,
	        Gary D Riley Course Technology
	10 Introduction to Expert Systems – By Peter Jackson – Addison Wesley
	   Publishing Company

Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based practical examination at the end of semester.

Course Code	Elective E
Course Title	Cyber Security and Forensic
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2017
Purpose of Course	The course gives students Understanding about major concept of Cyber Security and Forensic
Course Objective	To provide fundamental knowledge of Cyber crimes, Cyber security and Computer Forensics.
Pr-requisite	Basic Understanding of Networking , Web Application, Relational Database, Mobile Application
Course Out come	After completion of this course, the student will gain comprehensive knowledge of Cyber security and Forensic and aspects related to it.

Course Content	**Unit 1 Introduction to Cyber Crime and Cyber offences**
	
	1.1 Introduction cybercrime:- Definition, Cyber Crime and Information Security, Types and Category of Cyber Crime
	1.2 Techniques of Cyber Crimes
	    1.2.1 E-Mail Spoofing, Spamming, Cyberdefamation, Salami Attack, Data diddling, Hacking, Online fraud, Software Piracy, computer Sabotage, Email Bombing, Computer Network Intrusions, Password Sniffing, Credit Card Frauds
	1.3 How Criminal Plans Attacks
	    1.3.1 Reconnaissance Attack, Passive Attack, Active Attack, Scanning/ Scrutinizing information, Gaining and Maintaining the system Access
	    1.3.2 Cyberstaking:- Types of Cyberstaking cases of cyberstaking, How Stalking works
	    1.3.3 Botnets:- The fuel of cybercrime, Botnet Attack.
	    1.3.4 HoneyPot
	
	Unit 2 Cyber Crime: Mobile and Wireless Devices
	
	2.1 Introduction
	    2.1.1 Proliferation of Mobile and Wireless Devices,
	    2.1.2 Trends in Mobility,
	    2.1.3 Credit Card Frauds in Mobile and Wireless Computing ,
	    2.1.4 Types and Techniques of Credit Card Frauds
	2.2 Security Challenges
	    2.2.1 Security Challenges by Mobile Devices, Registry Settings for Mobile devices
	    2.2.2 Authentication Services Security Cryptographic Security For Mobile Devices, LDAP Security of Hand-Held Mobile computing devices
	    2.2.3 RAS Security for mobile devices, Media Player Control Security, Networking API Security for Mobile Computing Applications
	2.3 Attacks on Mobile Cell Phones
	    2.3.1 Mobile Phone Theft,

2.3.2 Mobile Viruses Mishing, Vishing, Smishing
   2.3.3 Hacking Bluetooth

2.4 Security Implication for Organization
   2.4.1 Managing Diversity and Proliferation of Handheld devices,
   2.4.2 Unconventional Storage Device threat through stolen devices
   2.4.3 Protecting Data on lost devices
2.5 Organizational Measures for handling Mobile devices
   2.5.1 Security issues , Encrypting Organizational database including mobile
      devices and security strategy
   2.5.2 Organizational security polices for mobile computing Devices
   2.5.3 Operating guidelines for implementing mobile Security polices
   2.5.4 Organizational polices for use of Mobile, Handheld devices Laptops and
      Physical Counter measures

Unit 3: Tools and Methods used in Cyber Crimes

3.1. Proxy Server and Anonymizers
3.2 Phishing: How phishing works
   3.2.1 Password Cracking:- Online Attack, offline Attacks Strong, weak and
       Randoms Passwords
 3.3 Keylloggers and Passwords
   3.3.1 Software Keyloggers
   3.3.2 Hardware Keyloggers,
   3.3.3 Antileyloggers
   3.3.4 Spywares
3.4 Virus and Worrms : Types of viruses , Trojan Horse Backdoors
3.5 Steganography: Steganalysis
3.6 Dos and DDoS attacks
   3.6.1 Classifications , Types or Levels of Dos attacks
   3.6.2 Protection from Dos / DDos Attacks
3.7 SQL Injections: Steps of SQL Injection attack and Avoidance of SQL
    Injection Attack
3.8 Attacks on Wirless networks
3.9 Secure of Wirless Attack

Unit 4 Computer Forensics

4.1 History of Cyberfornesic and Digital Forensic
4.2 Need of Computer Forensic
4.3 Cyberforensics and Digital Evidence
4.4 Forensic Analysis of Email
4.5 Digital Forensic Life cycle
4.6 Network Forensic
4.7 Computer Forensic Investigation
4.8 Computer Forensic and Steganography
4.9 Importance of OS1-7 layer to computer forensic
4.10 computer forensics security or privacy threat
4.11 Compliance perspective for Computer forensic
4.12 Challenges, Special Tools and Technique

	Unit 5: Forensic of Hand Held Device
	
	    5.1 Understanding cell phone working characteristics
	    5.2 Hand Held devices and digital forensic
	        5.2.1 Mobile Phone Forensic
	        5.2.2 PDA Forensic
	        5.2.3 Printer and scanner forensic
	        5.2.4 Smartphones and iPhones forensic
	        5.2.5Toolkits for handheld Devices Forensics

Reference Book	1 . Cyber Security Understanding cyber crimes computer forensics and legal Perspectives by Nina Godbole , Sunit Belapur by Wiley India Publications . 2. Internet Forensic Using Digital Evidences to Solve Computer Crime by Robert Jones O'Reilly October 2005. 3 . Windows ForensicThe Field Guide for conducting Corportate computer Investigations by Chad Steel Wiley India Publications. 4. Digital Evidence and Computer Crime by Eoghan Casey Academic Press 2011 3rd Edition . 5. CyberCrimes and Fraud Management by Mr. Petrick Kishore, macmillan education
Teaching Methodology	Classroom Discussion, Independent Study, Seminars / Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course Code	ELECTIVE F
Course Title	SEARCH ENGINE OPTIMIZATION
Credit	4
Teaching per Week	4 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	-
Purpose of Course	To provide comprehensive knowledge about theory behind Search Engine Optimization and search engine working
Course Objective	To provide the student sufficient knowledge to learn steps, need ,execute and evaluate the Search Engine Optimization initiatives
Pr-requisite	Fundamental Knowledge about Web Development, Searching Technologies and Metadata
Course Out come	After completion of this course, the student will gain comprehensive knowledge of Search engines and their working and various search engine optimization techniques

Course Content	**Unit 1 Search Engine and Ecommerce**
	1.1 Mission of Search Engine
	1.2 Human Goals of Searching, Determining searcher intent.
	1.3 Challenges for Marketer and search engine
	    1.3.1 People search,
	    1.3.2 Search engine drive ecommerce on web
	1.4 Eye Tracking:- User Scans Results pages, Click Tracking
	
	Unit 2 Search Engine Basic and SEO objectives
	2.1 What Is a Search Engine
	2.2 Anatomy of a Search Engine
	    2.2.1 Query interface
	    2.2.2 Crawlers, spiders, and robots
	    2.2.3 Databases
	    2.2.4 Characteristics of Search
	    2.2.5 Classifications of Search Engines
	        Primary search engines, Secondary search engines, Targeted search engines, Using Advance Search Techniques, Vertical Search Engines, Country Specific Search Engines, Web Directories
	    2.2.6 Search algorithms based ranking system, Indexing and Ranking,Determining Searcher Intent
	    2.2.7 Retrieval and ranking, Analysing Ranking Factors
	
	  2.3 SEO Objectives
	    2.3.1 Setting of SEO Goals and Objectives
	    2.3.2 Developing SEO Plans
	    2.3.3 Understanding SEO : SEO for Raw Traffic, SEO for Ecommerce Sales, SEO for Branding, SEO for lead generation and Marketing.
	
	Unit 3 Stages of SEO
	3.1 Major Element of Planning
	3.2 Identifying Site Development Process
	    3.2.1 Defining Site information Architecture
	    3.2.2 Auditing current site and Identify SEO problem
	    3.2.3 Identifying Current Server Statistics Software
	    3.2.4 Determine Top Competitor
	    3.2.5 Benchmarking Current Indexing Status, Ranking, Traffic

	Source and Volume
	3.3 Business Assets and Historical Data to conduct SEO SWOT Analysis
	
	Unit 4 Keyword Search and Optimization for Vertical Search
	    4.1 Theory of Keyword Search
	        4.1.1 Traditional Approach: Domain Expertise, Site Content Analysis
	        4.1.2 Keyword Research Tools
	        4.1.3 Determine Keyword value and Potential ROI
	        4.1.4 Leveraging of Long Tail of Keyword Demand
	        4.1.5.Keyword Demand :- Seasonality, Trending, Seasonal
	        Fluctuation
	    4.2 . Optimizing for Vertical Search
	        4.2.1 Opportunity in Vertical Search
	        4.2.2 Optimizing for Local Search, Image Search, Product Search
	        4.2.3 Optimizing for News, Blog and Feed Search
	        4.2.4 Optimizing for Mobile Video/Multimedia Search
	
	Unit 5 Tracking the Result and Measuring Success
	    5.1 Essential of Measuring Success of SEO Process
	    5.2 Measuring Search Traffic
	    5.3 Tying SEO to Conversion and ROI.
	    5.4 Competitive and Diagnostic Search Metrics
	    5.5 Key Performance Indicators for Long Tail SEO
	    5.6 SEO Tools - Google Webmaster Tools and Google Analytics
	        5.6.1 Google Webmaster Tools - Webmaster Tools Setup, Dashboard,
	            The "Site configuration" Section, The "Your site on the web"
	            Section, The Diagnostics Section,
	        5.6.2 Google Analytics- Installation and Setup, Navigating Google
	            Analytics, Dashboard, Traffic Sources, Content, Goals, Google
	            Analytics Shortcomings

Reference Book	1.The Art of SEO : Mastering Search Engine Optimization by Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola O'REILLY Publication 2nd edition 2. The Art of SEO : Mastering Search Engine Optimization by Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola O'REILLY Publication 3nd edition 3.SEO Search Engine Optimization Bible by Jerri L Ledford 2nd Edition Wiley India 4.SEO Warrior : Essential Techniques for Increasing Web Visibility by John I Jerkovic O'Reilly Publictation 5.Search Engine Optimization For Dummies by Peter Kent John Wiley and Son 5th Edition
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc. 70% assessment is based on end semester written examination

Course : 306 Practicals on Advanced PHP Programming

Course Code	306
Course Title	Practicals on Advanced PHP Programming
Credit	3
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2019
Purpose of Course	The purpose of the course is to make students capable of implementing concepts, methods and tools learnt in course 301 Advanced PHP Programming.
Course Objective	The Objective of these course is to to enable students to develop web applications in PHP
Pr-requisite	Programming Skill in Structured and Object Oriented Programming, Scripting Skills in HTML, Basics of Operating Systems, Networks and Database systems, Concepts of Web, HTTP etc.
Course Out come	After completion of this course, the student will be capable of developing professional web applications using PHP.
Course Content	The students will be required to carry out practical in Web Application Development on the topics covered in Paper 301: "Advanced PHP Programming" using the methods and tools discussed there in. A Journal must be prepared for the practical work done.
Reference Book	As Per Paper 301
Teaching Methodology	Lab Work
Evaluation Method	30% Internal assessment is based on Practical attendance, problem solving and , internal examination etc. 70% assessment is based practical examination at the end of semester.

Course : 307 Practicals on Mobile Application Development

Course Code	307
Course Title	Practicals in Mobile Application Development
Credit	4
Teaching per Week	4 hours
Minimum weeks per Semester	15 (Project work, Self-Study, examination, preparation, holidays etc.)
Review / Revision	--
Purpose of Course	The purpose of the course is to make students capable of developing professional applications using latest tools and technologies of Mobile Application Development.
Course Objective	To expose students to industrial practices and activities of software engineering and train them about the same using Mobile Application Development Tools and Technologies.
Pre-requisite	Knowledge of Advanced Programming, Latest Technologies and Tools and Software Engineering
Course Out come	After completion of this course, the student will be capable of developing professional applications using latest tools and technologies of Mobile Application Development.
Course Content	The students will be required to carry out practical in Mobile Application Development on the topics covered in Paper 302: "Mobile Application Development" using the methods and tools discussed there in. A Journal must be prepared for the practical work done.
Reference Book	As per Paper:302 Mobile Application Development
Teaching Methodology	Lab Work
Evaluation Method	30% Internal assessment is based on project presentation and/or demonstration and viva-voice examination. 70% assessment is based Project Presentation and/or demonstration and viva-voice examination at the end of semester.

Course : 308 Practical on Software Testing

Course Code	308
Course Title	Practical on Software Testing
Credit	3
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2017
Purpose of Course	The purpose of the course is to make students capable of implementing concepts, methods, tools and techniques of software testing learnt in course **303 Software Testing**
Course Objective	The Objective of these course is to enable students to Test desktop and Web Applications.
Pr-requisite	1) Basic understanding of Programming and Software Engineering 2) Only those students must have studied one of the following courses can opt this course: ◆ **M.Sc(Comp. Appl). Sem-3- 303 : Software Testing**
Course Out come	After completion of this course, the student will be capable of performing various types of testing on Software and Web Applications.
Course Content	The students will be required to carry out practical on Software Testing on the topics covered in Paper 303: "Software Testing" using the methods and tools discussed there in. A Journal must be prepared for the practical work done**.**
Reference Book	.As per paper 303 - Software Testing
Teaching Methodology	Lab Work
Evaluation Method	30% Internal assessment is based on Practical attendance, Problem Solving, internal examination etc. 70% assessment is based practical examination at the end of semester.

Course : 308 Practicals on AI modeling with Python

Course Code	308
Course Title	Practicals on AI modeling with Python
Credit	3
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2019
Purpose of Course	The purpose of the course is to make students capable of implementing concepts, methods, tools and techniques of software testing learnt in course **303 AI modeling with Python**
Course Objective	The Objective of these course is to enable students to : ◆ To learn Python programming and usage of various libraries ◆ To learn and implement Data processing and visualization routines ◆ To implement and evaluate some AI models in Python
Pr-requisite	1) Basic understanding of Programming and fundamentals of AI or Supervised Learning 2) Only those students must have studied the following courses can opt this course: **M.Sc(Comp. Appl). Sem-3- 303 : AI modeling with Python**
Course Out come	After completion of this course, the student will be capable of performing various types of testing on Software and Web Applications.
Course Content	The students will be required to carry out practical on Software Testing on the topics covered in Paper 303: "AI modeling with Python" using the methods and tools discussed there in. A Journal must be prepared for the practical work done.
Reference Book	.As per paper 303 - AI modeling with Python
Teaching Methodology	Lab Work
Evaluation Method	30% Internal assessment is based on Practical attendance, Problem Solving, internal examination etc. 70% assessment is based practical examination at the end of semester.

Course Code	401
Course Title	PROJECT
Credit	24
Teaching per Week	20 hours (i.e. 2 Students / hour / Week)
Minimum weeks per Semester	15 (Project work, Self-Study, examination, preparation, holidays etc.)
Last Review / Revision	June 2013
Purpose of Course	Students will get trained in industrial practices and activities of Software Engineering
Course Objective	To expose students to industrial practices and activities of software engineering and train them about the same
Pr-requisite	Knowledge of Advanced Programming, Latest Technologies and Tools and Software Engineering
Course Out come	After completion of this course, the student will be capable to start professional career and/or research work in the field of Information Technology
Course Content	Entire semester is allocated for a full-time project work. All the students have to undergo a project preferably in an industry or any reputed institute. The students must prepare documentation of the project work done as per the software Engineering Guidelines. At the end of the semester, the students have to submit their project report in bounded form to the respective institution. The project presentation and viva – voice will be conducted on the basis of it. The students have to submit the following reports to their respective institution: 1. Project Joining Report 2. Appropriate name of the project 3. Monthly Progress Report duly sign by the concern external guide 4. Project Completion Certificate 5. Institution/College Certificate 6. Software Coding declaration…(if industry/organization doesn't permit students to submit the source code) (To be submitted at the time of joining project training) 7. Attendance Report Without such reports student will not be allowed to appear in his/her final Project Presentation and Viva-Voice
Reference Book	.---
Teaching Methodology	Project guidance, review
Evaluation Method	30% Internal assessment is based on project presentation and/or demonstration and viva-voice examination. 70% assessment is based Project Presentation and/or demonstration and viva-voice examination at the end of semester.

Course : 402 Seminar

Course Code	402
Course Title	SEMINAR
Credit	6
Teaching per Week	10 hours (i.e. 4 Students / hour / Week)
Minimum weeks per Semester	15 (Project work, Self-Study, examination, preparation, holidays etc.)
Review / Revision	June 2015
Purpose of Course	The purpose of the course is to make student capable of gaining additional knowledge (besides the curricula) in the field of information technology by self learning practices and presenting and/or demonstrating it .
Course Objective	Additional knowledge building in the field of Information Technology using self-learning practice.
Pr-requisite	Basic Knowledge of Information Technology theories, activities, methods, techniques & tools
Course Out come	After completion of this course, the student will have gained some additional knowledge (besides the curricula) in the field of information technology by self learning practices and will be capable of presenting and/or demonstrating it
Course Content	In this paper students will have to select any topic related to information technology field– preferably based on the current trends and technologies for the seminar. Individual student is required to prepare a seminar report. At the end of the semester student has to submit seminar report with satisfactory detail study in the bounded form to the respective institution. The seminar presentation and viva voice will be conducted on the basis of selected topic at the end of the semester. The students have to submit the following documents to their respective institution: 1. Name and abstract of the Topic selected. 2. Monthly Progress Report duly signed by the concern internal guide 3. Work Completion Certificate by internal guide 4. Institution/College Certificate
Reference Book	.-------------
Teaching Methodology	Seminar Guidance and Report
Evaluation Method	30% Internal assessment is based on seminar presentation and viva-voice examination. 70% assessment is based on seminar presentation and viva-voice examination at the end of semester