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VEER NARMAD SOUTH GUJARAT UNIVERSITY

University Campus, Udhna-Magdalla Road, SURAT - 395 007, Gujarat, India.

વીર નર્મદ દક્ષિણ ગુજરાત યુનિવર્સિટી

યુનિવર્સિટી કેમ્પસ, ઉદ્ધના-મગદલા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.

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-: પરિપત્ર :-

બી.સી.એ./ બી.એસસી. (કોમ્પ્યુટર સાયન્સ) તથા એમ.એસસી. (કોમ્પ્યુટર એપ્લીકેશન) તથા એમ.સી.એ.નો અભ્યાસક્રમ ચલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓને તથા ડીપાર્ટમેન્ટના વડાશ્રીઓને જણાવવાનું કે, શૈક્ષણિક વર્ષ ૨૦૨૧-૨૨ થી અમલમાં આવનાર B.C.A. (2nd Year), B.Sc.(Computer Science) દ્વિતીય વર્ષ, M.Sc.(C A) દ્વિતીય વર્ષ, M.C.A. દ્વિતીય વર્ષના અભ્યાસક્રમ અંગે તા.૦૭/૦૧/૨૦૨૧ની સભામાં નીમેલ પેટાસમિતિએ તૈયાર કરેલ અભ્યાસક્રમ કોમ્પ્યુટર સાયન્સ અભ્યાસસમિતિ તથા કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની તા.૧૦/૦૫/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંક:૨ અન્વયે સ્વીકારી તે મંજૂર કરવા એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેડેમિક કાઉન્સિલે તેની તા. ૨૧/૦૫/૨૦૨૧ ની સભાના ઠરાવ ક્રમાંક : ૦૨ અન્વયે મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકો અને વિદ્યાર્થીઓને કરવી, તદ્ઉપરાંત તેનો અમલ કરવો.

કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસસમિતિ તથા કોમ્પ્યુટર સાયન્સ વિદ્યાશાખાની તા.૧૦/૦૫/૨૦૨૧ની સભાનાં ઠરાવ ક્રમાંક: ૨

:: આથી ઠરાવવામાં આવે છે કે, કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસસમિતિની તા.૭/૦૧/૨૧ની સભામાં નીમેલ પેટાસમિતિએ તૈયાર કરેલ નીચે મુજબ નાં નવા અભ્યાસક્રમ મંજૂર કરી તે મંજૂર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

- (૧) B.C.A. (2nd Year) નો અભ્યાસક્રમ સબકમીટીએ તૈયાર કરેલ અભ્યાસક્રમને સ્વીકારી ફેકલ્ટીને ભલામણ કરવામાં આવે છે.
- (૨) B.Sc. (Computer Science) દ્વિતીય વર્ષનો અભ્યાસક્રમ સબકમીટીએ તૈયાર કરેલ અભ્યાસક્રમને સ્વીકારી ફેકલ્ટીને ભલામણ કરવામાં આવે છે.
- (૩) M.Sc. (CA) દ્વિતીય વર્ષનો અભ્યાસક્રમ સબકમીટીએ તૈયાર કરેલ અભ્યાસક્રમને સ્વીકારી ફેકલ્ટીને ભલામણ કરવામાં આવે છે.
- (૪) M.C.A. દ્વિતીય વર્ષના અભ્યાસક્રમ સબકમીટીએ તૈયાર કરેલ અભ્યાસક્રમને સ્વીકારી ફેકલ્ટીને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૨૧/૦૫/૨૦૨૧ની ઠરાવ ક્રમાંક:૦૨

:: આથી ઠરાવવામાં આવે છે કે, કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસસમિતિ તથા કોમ્પ્યુટર સાયન્સ વિદ્યાશાખાએ તેની તા. ૧૦/૦૫/૨૦૨૧ ની સભાના ઠરાવ ક્રમાંક : ૨ અન્વયે સ્વીકારેલ નીચે મુજબનાં અભ્યાસક્રમો મંજૂર કરવામાં આવે છે.

- (૧) B.C.A. (2nd Year) નો અભ્યાસક્રમ
- (૨) B.Sc. (Computer Science) દ્વિતીય વર્ષનો અભ્યાસક્રમ
- (૩) M.Sc. (CA) દ્વિતીય વર્ષનો અભ્યાસક્રમ
- (૪) M.C.A. દ્વિતીય વર્ષના અભ્યાસક્રમ

બિડાણ: ઉપર મુજબ

ક્રમાંક : એક./પરિપત્ર/૭૦૧૫/૨૧
તા.૨૮/૦૫/૨૦૨૧

ઈ.ચા.કુલસચિવ

પ્રતિ,

- ૧) બી.સી.એ./ બી.એસસી. (કોમ્પ્યુટર સાયન્સ) તથા એમ.એસસી. (કોમ્પ્યુટર એપ્લીકેશન) નો અભ્યાસક્રમ ચલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓ તથા ડિપાર્ટમેન્ટના વડાશ્રીઓ.
- ૨) ડીનશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા
- ૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

Master of Science (Computer Application) 2019-20

Name of Program	Master of Science (Computer Application)
Abbreviation	MSC(CA)
Duration	2 Years (Regular)
Eligibility	Candidate must have passed Bachelors Degree in Computer Science / Computer Application / Information Technology / Computer Engineering / equivalent degree in Computer / IT field.
Objective of Program	The Objective of the program is to impart knowledge of advanced and/or latest theories, concepts, methods, techniques and tools related to various areas of Computer Science, Applications and Information Technology and specifically in the area of Mobile based, cloud based, Web based Application Development, Software Engineering, Data Management and Intelligent Systems.
Program Outcome	At the successful completion of the program, students will be able to start their career in the Information Technology industry.
Program Structure	Semester 1

Course Code	Title	Teaching Hrs. per week		Course Credits	University Examination		Internal Marks	Total Marks
		Theory	Practical		Duration	Marks		
101	Advanced Software Engineering	4	0	4	3 Hrs	70	30	100
	Fundamentals of Artificial Intelligence							
102	Advance Database Management System	4	0	4	3 Hrs	70	30	100
103	Fundamentals of Web Client Technologies.	4	0	4	3 Hrs	70	30	100
104	Enterprise Data Management and ERP	4	0	4	3 Hrs	70	30	100
	Fundamentals of Big Data							
105	Web Programming Using Java	4	0	4	3 Hrs	70	30	100
106	Practical in Web Programming Using Java	0	4	4	4Hrs	70	30	100
107	Practical in Web Client Technologies	0	3	3	2 Hrs	70	30	100
108	Practical in Advanced Database Management System	0	3	3	2 Hrs.	70	30	100

		Semester -2						
Course Code	Title	Teaching Hrs. per week		Course Credits	University Examination		Internal Marks	Total Marks
		Theory	Practical		Duration	Marks		
201	Service Oriented Architecture	4	0	4	3 Hrs	70	30	100
202	Web Programming Using C#	4	0	4	3 Hrs	70	30	100
203	Advanced Scripting Languages	4	0	4	3 Hrs	70	30	100
204	Data Warehousing and Data Mining	4	0	4	3 Hrs	70	30	100
	Internet of Things							
205	Information Security	4	0	4	3 Hrs	70	30	100
206	Practicals in Web Programming Using C#	0	4	4	2 Hrs	70	30	100
207	Practicals in Advanced Scripting Languages	0	4	4	2 Hrs	70	30	100
208	Practicals on Cryptography	0	2	2	2 Hrs	70	30	100

2nd Year Master of Science (Computer Application) 2020-21

		Semester 3						
Course Code	Title	Teaching per week		Course Credits	University Examination		Internal Marks	Total Marks
		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	4	0	4	3 Hrs	70	30	100
	AI Modeling with Python							
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	0	3	3	2 Hrs	70	30	100
	Practicals on AI modeling with Python							
TOTAL		20	10	30		560	240	800

Elective 1 and 2 are to be selected from the following papers:

- a) Distributed Databases
- b) Multimedia Systems
- c) Advanced Artificial Intelligence
- d) Cyber Security and Forensics
- e) Search Engine Optimization and Digital Marketing

		Semester 4				
Course Code	Title	Course Credits	University Marks	Internal Exam Marks	Total Marks	
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	<p>Unit 1 Codeigniter Framework</p> <p>1.1 Introduction to Codeigniter: setup, Configuration files support, Application flow control and model-view-controller architecture</p> <p>1.2 Codigniter URL□ s , Helper’s file and URI routing, Codeigniter in-built libraries, Common functions, Error Handling</p> <p>1.3 OOP in Codeigniter</p> <p>Unit 2 Web Application Development using Codignitor</p> <p>2.1 Working with forms and validations</p> <p>2.2 Cookies and Session Management</p> <p>2.3 Using built in helpers for Email and SMTP support</p> <p>2.4 Crud operation in Codeigniter using SQLite / MYSQL</p> <p>Unit 3 Working with images, pdf files and XML (with OOP/Codeigniter)</p> <p>2.1 Working with images</p> <p>2.1.1 Creating and manipulating images</p> <p>2.1.2 Using Text in Images</p> <p>2.1.3 Saving and building on existing image.</p> <p>2.2 Generating PDF file with text, shapes and images.</p> <p>2.3 PHP with XML</p> <p>2.3.1 XML Introduction</p> <p>2.3.2 Generating XML Document</p> <p>2.3.3 Parsing XML Document</p> <p>Unit 4 Web services in PHP</p> <p>4.1 Creating web services</p> <p>4.2 Discovering web service</p> <p>4.3 Accessing web services.</p> <p>4.4 API integration using third-party libraries in Codeignitor (EX: Google Maps CI, LinkedIn API Wrapper , etc.)</p> <p>Unit 5 Laravel Framework</p> <p>5.1 Introduction to Laravel, features and advantages</p> <p>5.2 Composer installation for Laravel:</p>

	<p>5.2.1 Create Project in IDE</p> <p>5.2.2 Setup Local Host file: Vhost Entry, httpd.conf, MOD Rewrite, Restart Apache</p> <p>5.3 Application Structure : App, Console, Events, Exceptions, Http, Jobs, Listener, Config, Database, Resources, Storage, Vendor</p> <p>5.4 Environment configuration , Setup the DB</p> <p>5.5 Laravel Routing : Basic Routing, Route Parameters, Named Routes</p> <p>5.6 Laravel Middleware , Request & Response</p> <p>5.7 Laravel View & Blade template</p> <p>5.8 Laravel Controllers & Redirecting.</p> <p>5.9 Basic introduction to Database migrations and Eloquent Models</p>
Reference Book	<ol style="list-style-type: none"> 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	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment / seminar, internal examination etc.</p> <p>70% assessment is based on end semester written examination</p>

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	<p>Unit 1.Introduction To android</p> <ul style="list-style-type: none"> 1.1 Architecture Of Android OS 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 <ul style="list-style-type: none"> 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) 1.7 Introduction to cross-platform development using flutter <p>Unit 2. Programming with Android</p> <ul style="list-style-type: none"> 2.1 Directory Structure of Android Application 2.2 Creating And Working with Android Activities 2.3 Application Manifest 2.4 Creating User Interface <ul style="list-style-type: none"> 2.4.1. Fundamental UI Design 2.4.2. Layouts and its attributes 2.4.3. Drawable Resources 2.4.4 Fragments 2.5 Deploying Android Application <p>Unit 3. Working with Data</p> <ul style="list-style-type: none"> 3.1 Working with SQLite database 3.2 Shared Preferences-Creating, Saving, Retrieving Shared Preferences. 3.3 Creating and using Content Providers. 3.4 Working with Firebase Realtime Database <p>Unit 4. Advanced Android Programming</p> <ul style="list-style-type: none"> 4.1 Working with advanced UI controls <ul style="list-style-type: none"> 4.1.1 Working with Listviews - Simple Listview, Custom Listview 4.1.2. Working with Menus

	<p>4.1.3 Working with Dialog classes - Alert dialog, Specialist input dialog, Using Activities as dialogs.</p> <p>4.2 Working with Webview</p> <p>4.3 Working with Intents-Intents, Linkify, Broadcast Receivers, Intent Filters</p> <p>4.4 Working with Notifications</p> <p>Unit 5. Working with other Resources</p> <p>5.1 Using Internet Resources, Services, Google App engine, Geocoder and Google Maps</p> <p>5.2 Audio, Video and Using the Camera</p> <p>5.2.1 Playing and recording Audio and Video</p> <p>5.2.2 Working with the Camera</p>
Reference Book	<ol style="list-style-type: none"> 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	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on end semester written examination</p>

Course: 303: SOFTWARE TESTING

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	<p>Unit -1 Software Testing</p> <p>1.1 Role and objective of Testing, Central Issue in Testing, Testing Activities</p> <p>1.2 Testing Approaches-Whitebox, Blackbox and Greybox</p> <p>1.3 Levels of testing : Unit, Integration, System and Acceptance</p> <p>Unit 2: Types of testings</p> <p>2.1 Code coverage-program statement and Line coverage, Branch coverage, condition Coverage, path coverage, function/procedure coverage</p> <p>2.2 Data Testing-Testing for Boundary conditions, Sub-Boundary conditions, Default, Empty, Null, Zero, None, Invalid, Wrong, Incorrect, Garbage Data</p> <p>2.3 Functional Testing:</p> <p>2.3.1 Testing for Correctness, Completeness, Accuracy, Precision</p> <p>2.3.2 Test to pass and test to fail</p> <p>2.4 Behavioral Testing: State based testing, Testing for Stress, Load, Performance, Security</p> <p>2.5 Regression testing, Smoke testing and Sanity Testing</p> <p>2.6 Basics of Usability Testing, Configuration Testing and Compatibility Testing</p> <p>2.7 Basics of Testing for Web & Mobile Applications</p> <p>Unit 3: Test Automation</p> <p>3.1 Manual Testing Vs. Automated Testing</p> <p>3.2 Criteria for Test Automation</p> <p>3.3 Tool Selection and Introduction criteria</p> <p>3.4 Cost Effectiveness of Tool Introduction</p> <p>3.5 Types of test tools</p> <p>3.5.1 Requirements and basic characteristic of Tool for Test management and Control</p> <p>3.5.2 Requirements and basic characteristic of Tool for Test Case Generation</p> <p>3.5.3 Requirements and basic characteristic of Tool for Test Execution</p> <p>3.5.4 Requirements and basic characteristic of Tool for Regression Testing</p>

	<p>Unit 4 Test Automation Tools</p> <p>4.1 Unit Testing with NUnit</p> <p>4.1.1 NUnit framework, Test Fixture, Test, Setup & Tear Down, Asserts and Exception</p> <p>4.1.2 Writing and executing testcases with NUnit</p> <p>4.2 Unit Testing with JUnit</p> <p>4.2.1 JUnit framework, Test Fixture, TestCase, Setup & Tear Down Asserts and Exception</p> <p>4.2.2 Writing and executing testcases with JUnit</p> <p>4.3 Functional Web Testing Using Selenium and Selenium Web Driver</p> <p>4.3.1 Creating, Saving and Exporting TestCases and TestSuites</p> <p>4.3.2 Test recording and playback using Selenium</p> <p>4.3.3 Fundamentals of Selenium commands, parameters, element locators filters and string match patterns</p> <p>Unit 5: Other testing Tools</p> <p>5.1 Test case generation Tool-case study of TestCaseGenerator</p> <p>5.2 Tool for Bug Tracking- case study of Bugzilla</p> <p>5.3 Tool for Test Management-case study of Tlink</p>
Reference Book	<ol style="list-style-type: none"> 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 Reference”, SDP-OREilly, , 2004 7. Andrew Hunt and David Thomas, “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	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on end semester written examination</p>

Course : 303 : AI Modeling with Python

Course Code	303
Course Title	AI Modeling 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	<ul style="list-style-type: none"> ◆ 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	<p>Only those Students who have completed any one of the following courses can opt this course:</p> <p>1)M.Sc(Comp. Appl). Sem-1- 101: Fundamentals of Artificial intelligence 2) M.Sc(Comp. Appl). Sem-II- 204: Datawarehousing and Data mining</p>
Course Out come	After completion of this course, the student will be capable to model some AI applications using Python.
Course Content	<p>Unit 1 Basic Python Libraries : Numpy and Pandas</p> <p>1.1 Arrays and Vectorized Computation using NumPy</p> <p style="padding-left: 20px;">1.1.1 The NumPy ndarray: A Multidimensional Array Object</p> <p style="padding-left: 20px;">1.1.2 Universal Functions: Fast Element-wise Array Functions</p> <p style="padding-left: 20px;">1.1.3 Data Processing and File I/O with Arrays</p> <p>1.2 Data Operations and Pre-Processing with Pandas</p> <p style="padding-left: 20px;">1.2.1 Operations on Data</p> <p style="padding-left: 20px;">1.2.2 Reading and Writing Data in Text Format</p> <p style="padding-left: 20px;">1.2.3 Summarizing and Computing Descriptive Statistics</p> <p style="padding-left: 20px;">1.2.4 Handling Missing Data, Combining and Merging Data Sets, Reshaping and Pivoting, Data Transformation, String Manipulation</p> <p style="padding-left: 20px;">1.2.5 Plotting and Visualization using Pandas</p> <p>Unit 2: Plotting and Visualization using Matplotlib</p> <p style="padding-left: 20px;">2.1 PyPlot and Plotting</p> <p style="padding-left: 20px;">2.2 Markers, Lines and Lables</p> <p style="padding-left: 20px;">2.3 Grids, Sublpots and Scatter Plots</p> <p style="padding-left: 20px;">2.4 Bars Histograms and Piecharts</p> <p style="padding-left: 20px;">2.5 Images, Contours and Fields</p> <p style="padding-left: 20px;">2.6 Working with Shapes, Collections and Stylesheets</p> <p style="padding-left: 20px;">2.7 Introduction to Animation and Event Handling in Matplotlib</p> <p>Unit 3 Modeling AI Applications in Python</p> <p style="padding-left: 20px;">3.1 Overview of Machine Learning</p> <p style="padding-left: 20px;">3.2 Supervised Learning and Classifiers</p> <p style="padding-left: 20px;">3.3 Model Train-Test and Learning Concepts, Model Evaluation</p> <p style="padding-left: 20px;">3.4 Modeling Supervised Machine Learning - Naive Bayes classifiers Modeling k-Nearest Neighbor</p> <p style="padding-left: 20px;">3.5 Modeling Decision Tree based classifier</p> <p style="padding-left: 20px;">3.6 Confusion Metrics</p> <p>Unit 4 Linear Models and Artificial Neural Networks</p> <p style="padding-left: 20px;">4.1 Regression, Generalization, Overfitting, and Underfitting, Relation of Model Complexity to Dataset Size</p> <p style="padding-left: 20px;">4.2 Linear Regression and its application</p>

	<p>4.3 Modeling Neural Network</p> <p>4.2.1 Defining ANN in Python - layers and Multilayer Perceptron, weights, bias, Activation Function, Loss function, Epochs</p> <p>4.2.2 Training and testing Neural Network, Feed Forward Neural Network, Backpropagation Neural Network, Error calculation</p> <p>Unit 5 Model Evaluation and Improvement</p> <p>5.1. Cross-Validation and its benefits</p> <p>5.1.1. Cross-Validation in scikit-learn</p> <p>5.1.2. Stratified k-Fold Cross-Validation and Other Strategies</p> <p>5.2. Evaluation Metrics and Scoring</p> <p>5.2.1. Keep the End Goal in Mind</p> <p>5.2.2 Metrics for Binary Classification, Multiclass Classification, Regression Metrics</p> <p>5.2.3. Using Evaluation Metrics in Model Selection</p> <p>5.2.4 Overview of Model Deployment</p>
Reference Book	<ol style="list-style-type: none"> 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	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on end semester written examination</p>

Course : Elective - A - DISTRIBUTED DATABASE MANAGEMENT SYSTEM

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	<p>Unit 1 Introduction to Distributed database Management System</p> <p>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</p> <p>Unit 2 Distributed Database Design</p> <p>2.1 Alternative design strategies 2.2 Distributed design issues 2.3 Fragmentation, Data allocation</p> <p>Unit 3 Query Processing Issues & query optimization in distributed databases</p> <p>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</p> <p>Unit 4 Distributed Object Management and query processing</p> <p>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</p>

	<p>Unit 5 Transaction Management in Distributed Databases</p> <p>5.1 The concept of „transaction“</p> <p>5.2 Goals of transaction management, Characteristics of transactions</p> <p>5.3 Taxonomy of transaction models</p>
Reference Book	<ol style="list-style-type: none"> 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 Modern 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 -B 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	<p>1. Computer graphics</p> <ul style="list-style-type: none"> 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 <p>2. Video & Animation</p> <ul style="list-style-type: none"> 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 <p>3. Sound</p> <ul style="list-style-type: none"> 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

	<p>4. Distributed Multimedia system</p> <p>4.1. Operating System Introduction to DMS</p> <p>4.2. Main Features of DMS</p> <p>4.3. Resources Management of DMS</p> <p>4.4. Networking</p> <p>4.5. Multimedia</p> <p>4.6. Distributed Multimedia Servers</p> <p>4.7. Distributed Multimedia Application</p> <p>5. Multimedia Data Compression</p> <p>5.1 Data Compression Terminology</p> <p>5.2 A Classification of Data Compression Terminology</p> <p>5.3 Data Compression Technology</p> <p>5.4 Compression Standards</p> <p>5.5 Image Compression</p> <p>5.6 Video compression</p> <p>5.7 Audio compression</p>
Reference Book	<p>1. Digital multimedia 3/e illustrated – Chapman, Nigel P. Chapman, Jenny Chapman – Wiley , 2009</p> <p>2. Multimedia – Making it Work – Tay Vaudhan Tata Mcgraw Hill ISBN</p> <p>3. Streaming Multimedia – Steve Mack - John Wiley</p> <p>4. Multimedia Communication System - LPE Pearson – Education Publication.</p>
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 Advanced Artificial Intelligence

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	<ul style="list-style-type: none"> ◆ 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	<p>Only those Students who have completed the following course can opt this course:</p> <p>1) M.Sc(Comp. Appl). Sem-1- 101: Fundamentals of Artificial intelligence</p>
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	<p>Unit 1: Expert Systems</p> <p>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</p> <p>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,</p> <p>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</p> <p>Unit 2: Natural language processing</p> <p>2.1 Introduction - Communication as action, fundamentals of language, the component steps of communication,</p> <p>2.2 Language Models - <i>N gram</i> character models, model smoothing, model evaluation, <i>N gram</i> word models</p> <p>2.3 Text Classification</p> <p>2.4 Information Retrieval - IR scoring functions, IR system evaluations, IR refinements, The PAGERANK algorithm, The HITS algorithm, Question answering</p> <p>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</p> <p>Unit 3: Natural language for Communication</p> <p>3.1 Introduction - Communication as action, fundamentals of language, Grammar Formal isms and their generative capacity, the component steps of communication,</p> <p>3.2 Phrase structure Grammars - The lexicon of E0, The grammar of E0,</p> <p>3.3 Syntactic Analysis(Parsing) - CYK algorithm, Learning probabilities for PCFGs</p> <p>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</p> <p>3.5 Machine Translation-machine translation systems, Statistical machine translation,</p> <p>3.6 Speech Recognition - Acoustic model, Language model, Building a</p>

	<p>speech recognizer</p> <p>Unit 4. Perception</p> <p>4.1 Image Formation-The pinhole camera, Lens systems, Scaled Orthographic projection, Light and Shading, Color</p> <p>4.2 Early Image-Processing Operations - Smoothing, Edge detection, Texture, Optical flow, Image segmentation</p> <p>4.3 Object Recognition by Appearance-Complex appearance and pattern elements, pedestrian detection with HOG features</p> <p>4.4 Reconstructing the 3D World - Motion parallax, Binocular stereopsis, Multiple views, Texture, Shading, Contour, Objects and geometric structures of scenes</p> <p>4.5 Object Recognition from Structural Information - The geometry of bodies, Coherent appearance</p> <p>4.6 Using Vision- The problem of image tagging/annotation, Reconstruction from many views, Using vision for controlling movement</p> <p>5. Robotics</p> <p>5.1 Introduction</p> <p>5.2 Robot Hardware-Sensors, Effectors</p> <p>5.3 Robotic Perception - The problems of state estimation, Localization and mapping, other types of perceptions, machine learning in robot perception,</p> <p>5.4 Planning to Move - Configuration space, Cell decomposition methods, Modified cost functions, Skeletonization methods,</p> <p>5.5 Planning Uncertain Movements- Robust methods</p> <p>5.6 Moving - Dynamics and control, Potential field control, Reactive control, Reinforcement learning control,</p> <p>5.7 Robotic Software Architectures - Subsumption architecture, Three-layer architecture, Pipeline architecture</p> <p>5.8 Application Domains of robotics</p>
Reference Book	<ol style="list-style-type: none"> 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.Sarukesian and 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	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based practical examination at the end of semester.</p>

Course: Elective D- Cyber Security and Forensic

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	<p>Unit 1 Introduction to Cyber Crime and Cyber offences</p> <p>1.1 Introduction of Cybercrime:- Definition, Cyber Crime and Information Security, Types and Category of Cyber Crime</p> <p>1.2 Techniques of CyberCrimes</p> <p>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 CardFrauds</p> <p>1.3 How Criminal Plans Attacks</p> <p>1.3.1 Reconnaissance Attack, Passive Attack, Active Attack, Scanning/ Scrutinizing information, Gaining and Maintaining the system Access</p> <p>1.3.2 Cyberstalking:- Types of Cyberstalking cases of cyberstalking, How Stalking works</p> <p>1.3.3 Botnets:- The fuel of cybercrime, Botnet Attack.</p> <p>1.3.4 Honeypot</p> <p>Unit 2 Cyber Crime: Mobile and Wireless Devices</p> <p>2.1 Introduction</p> <p>2.1.1 Proliferation of Mobile and Wireless Devices,</p> <p>2.1.2 Trends in Mobility,</p> <p>2.1.3 Credit Card Frauds in Mobile and Wireless Computing ,</p> <p>2.1.4 Types and Techniques of Credit Card Frauds</p> <p>2.2 Security Challenges</p> <p>2.2.1 Security Challenges by Mobile Devices, Registry Settings for Mobile devices</p> <p>2.2.2 Authentication Services Security Cryptographic Security For Mobile Devices, LDAP Security of Hand-Held Mobile computing devices</p> <p>2.2.3 RAS Security for mobile devices, Media Player Control Security, Networking API Security for Mobile Computing Applications</p> <p>2.3 3 Attacks on Mobile Cell Phones</p> <p>2.3.1 Mobile Phone Theft,</p>

2.3.3 Mobile Viruses Mishing, Vishing, Smishing

2.3.2 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 policies for mobile computing Devices

2.5.3 Operating guidelines for implementing mobile Security policies

2.5.4 Organizational policies 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 Keyloggers and Passwords

3.3.1 Software Keyloggers

3.3.2 Hardware Keyloggers,

3.3.3 Antileyloggers

3.3.4 Spywares

3.4 Penetration testing tools:

3.4.1 NMAP, External and internal network scanning,

3.4.2 WIFI Penetration testing.

3.5 Cloud Security

3.6 IoT Security

3.7 Securing and processing the evidence

3.7.1 Incident handling steps & process

3.7.2 Creating duplicate images of storage media

3.7.3 Investigating Website & web application

3.7.4 Tracing the activity of target computer

3.7.5 Registering and processing cyber crime complaint

Unit 4 Computer Forensics

4.1 History of Cyberforensic and Digital Forensic

4.2 Need of Computer Forensic

4.3 Cyberforensics and Digital Evidence

4.4 Digital Forensic Life cycle

4.5 Forensic Analysis of Email

4.6 Network Forensic Importance of OS1-7 layer to computer forensic

4.7 Computer Forensic Investigation

4.8 Computer Forensic and Steganography

4.9 Analysis of CCTV Footage

4.10 computer forensics security or privacy threat

4.11 OS Forensic: Windows forensics, Android and IOS forensic

4.12 Analysis of Audio evidences, Analysis of Image and Video evidences

4.13 Introduction to Blockchain and Cryptocurrencies

	<p>4.14 Legal admissibility of multimedia evidences</p> <p>4.15 Compliance perspective for Computer forensic</p> <p>4.16 Challenges, Special Tools and Technique</p> <p>4.17 Cyber Security Audit and Compliance</p> <p>Unit 5: Forensic of Hand Held Device</p> <p>5.1 Understanding cell phone working characteristics</p> <p>5.2 Hand Held devices and digital forensic</p> <p> 5.2.1 Mobile Phone Forensic</p> <p> 5.2.2 PDA Forensic</p> <p> 5.2.3 Printer and scanner forensic</p> <p> 5.2.4 Smartphones and iPhones forensic</p> <p> 5.2.5 Toolkits for handheld Devices Forensics</p>
Reference Book	<ol style="list-style-type: none"> 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 Forensic The Field Guide for conducting Corporate computer Investigations by Chad Steel Wiley India Publications. 4. Digital Evidence and Computer Crime by Eoghan Casey Academic Press 2011 3rd Edition . 5. Cyber Crimes and Fraud Management by Mr. Petrick Kishore, macmillan education
Teaching Methodology	Classroom Discussion, Independent Study, Seminars / Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on end semester written examination</p>

Course : Elective -E SEARCH ENGINE OPTIMIZATION AND DIGITAL MARKETTING

Course Code	ELECTIVE F
Course Title	SEARCH ENGINE OPTIMIZATION AND DIGITAL MARKETTING
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 and prepare them for Digital Marketing
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 and will be ready to work in the field of Digital Marketing
Course Content	<p>Unit 1 Search Engine and Ecommerce</p> <p>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</p> <p>Unit 2 Search Engine Basic, SEO objectives</p> <p>2.1 SEO Objectives 2.2 Anatomy of a Search Engine 2.2.1 Query interface 2.2.2 Crawlers, spiders, and robots 2.2.3 Databases 2.3 Identifying Site Development Process 2.3.1 Defining Site information Architecture 2.3.2 Auditing current site and Identify SEO problem 2.3.3 Identifying Current Server Statistics Software 2.3.4 Determine Top Competitor 2.4 Theory of Keyword Search 2.4.1 Keyword Research Tools 2.4.2 Leveraging of Long Tail of Keyword Demand 2.4.3.Keyword Demand :- Seasonality, Trending, Seasonal Fluctuation</p> <p>Unit 3 Tracking the Result and Measuring Success</p> <p>3.1 Measuring Success of SEO Process 3.2 Measuring Search Traffic 3.3 SEO Tools - Google Webmaster Tools and Google Analytics 3.4 Google Webmaster Tools - Webmaster Tools Setup, Dashboard, The “Site configuration” Section, The “Your site on the web” Section, The Diagnostics Section 3.5 Google Analytics- Installation and Setup, Navigating Google Analytics, Dashboard, Traffic Sources, Content, Goals, Google Analytics Shortcomings</p> <p>Unit 4 Digital Marketing Fundamentals</p> <p>4.1 Marketing v/s Sales, Inbound v/s Outbound marketing</p>

	<p>4.2 Content marketing, Strategic flow for marketing activities Understanding Leads</p> <p>4.3 Facebook Marketing Fundamentals</p> <p>4.3.1 Profiles and Pages, Business Categories</p> <p>4.3.2 Creating Facebook Pages, Page Info and Settings , Facebook Page Custom URL, Invite Page Likes</p> <p>4.3.3 Facebook Events, Facebook Insights Reports</p> <p>4.4 Affiliate marketing</p> <p>Unit 5 YouTube Marketing and Email Marketing</p> <p>5.1 Video Flow</p> <p>5.2 Google Pages for YouTube Channel</p> <p>5.3 Verify Channel and Linking Custom Channel URL</p> <p>5.4 Uploading Videos, Uploading Defaults Creator Library, Live Broadcasting and Practical Examples</p> <p>5.5 Email Marketing, Content writing,Email Software and Tools</p>
Reference Book	<p>1.The Art of SEO : Mastering Search Engine Optimization by Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola O□ REILLY Publication 2nd edition</p> <p>2. The Art of SEO : Mastering Search Engine Optimization by Eric Enge, Stephan Spencer, Rand Fishkin, Jessie C Stricchiola O□ REILLY Publication 3rd edition</p> <p>3.SEO Search Engine Optimization Bible by Jerri L Ledford 2nd Edition Wiley India</p> <p>4.SEO Warrior : Essential Techniques for Increasing Web Visibility by John I Jerkovic O□ ReillyPublicitation</p> <p>5.Search Engine Optimization For Dummies by Peter Kent John Wiley and Son 5th Edition</p> <p>6.Digital Marketing -by Seema Gupta. McGrawHill, Second Edition</p> <p>7. The Art of Digital Marketing: The Definitive Guide to Creating Strategic, Targeted, and Measurable Online Campaigns by Ian Dodson , Wiley Publication</p> <p>8.Digital Marketing For Dummies by Russ Henneberry, Ryan Deiss, For Dummies Publication</p>
Teaching Methodology	Discussion, Independent Study, Seminars and Assignment
Evaluation Method	<p>30% Internal assessment is based on class attendance, participation, class test, quiz, assignment, seminar, internal examination etc.</p> <p>70% assessment is based on end semester written examination</p>

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	<p>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.</p> <p>A Journal must be prepared for the practical work done.</p>
Reference Book	As per Paper:302 Mobile Application Development
Teaching Methodology	LabWork
Evaluation Method	<p>30% Internal assessment is based on project presentation and/or demonstration and viva-voice examination.</p> <p>70% assessment is based Project Presentation and/or demonstration and viva-voice examination at the end of semester.</p>

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 : <ul style="list-style-type: none"> ◆ 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 : 401 Project

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	<p>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.</p> <p>The students have to submit the following reports to their respective institution:</p> <ol style="list-style-type: none"> 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 <p>Without such reports student will not be allowed to appear in his/her final Project Presentation and Viva-Voice</p>
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	<p>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.</p> <p>The students have to submit the following documents to their respective institution:</p> <ol style="list-style-type: none"> 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