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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, ઉધના-મગદલ્લા રોડ, સુરત - ૩૯૫ ૦૦૭, ગુજરાત, ભારત.
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–: પરિપત્ર :–

બી.એસસી.(કોમ્પ્યુટર સાયન્સ)નો અભ્યાસક્રમ ચલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓને જણાવવાનું કે, T.Y.B.Sc.(Computer Science) (Sem-V & Sem-VI),ના અભ્યાસક્રમ અંગે કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસસમિતિની તા.૧૨/૦૩/૨૦૧૯ની સભાનાં ઠરાવ ક્રમાંકઃ ૭ અન્વયે કરેલ નીચેની ભલામણ કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાએ તેની તા.૨૯/૦૪/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંકઃ ૭ અન્વયે સ્વીકારી તે મંજૂર કરવા એકેડેમિક કાઉન્સિલને કરેલ ભલામણ એકેમિક કાઉન્સિલે તેની તા.૦૭/૦૬/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંકઃ ૩૯ અન્વયે સ્વીકારી મંજૂર કરેલ છે. તેની જાણ સંબંધકર્તા શિક્ષકોને, તદ્ઉપરાંત તેનો અમલ કરવો.

કોમ્પ્યુટર સાયન્સ વિષયની અભ્યાસસમિતિની તા.૧૨/૦૩/૨૦૧૯ની સભાનાં ભલામણ ક્રમાંકઃ ૭

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર T.Y.B.Sc.(Computer Science) (Sem-V & Sem-VI), અભ્યાસક્રમ સ્વીકારી તે મંજૂર કરવા કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાને ભલામણ કરવામાં આવે છે.

<u>કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખાની તા.૨૯/૦૪/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંકઃ ૭</u>

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર T.Y.B.Sc. (Computer Science) (Sem-V & Sem-VI), અભ્યાસક્રમ સ્વીકારી મંજૂર કરવામાં આવે છે અને તે મંજુર કરવા એકેડેમિક કાઉન્સિલને ભલામણ કરવામાં આવે છે.

એકેડેમિક કાઉન્સિલની તા.૦૭/૦૬/૨૦૧૯ ની સભાનાં ઠરાવ ક્રમાંકઃ ૩૯

:: આથી ઠરાવવામાં આવે છે કે, શૈક્ષણિક વર્ષ ૨૦૧૯–૨૦ થી અમલમાં આવનાર T.Y.B.Sc. (Computer Science) (Sem-V & Sem-VI), અભ્યાસક્રમ સ્વીકારી મંજૂર કરવામાં આવે છે.

બિડાણઃ ઉપર મુજબ

ક્રમાંક : એકે./પરિપત્ર/૧૦૩૬૯/૧૯
તા.૨૦/૦૬/૨૦૧૯

ઈ.ચા.કુલસચિવ

પ્રતિ,

૧) બી.એસસી.(કોમ્પ્યુટર સાયન્સ) નો અભ્યાસક્રમ ચલાવતી સંલગ્ન કોલેજોના આચાર્યશ્રીઓ.
૨) ડીનશ્રી, કોમ્પ્યુટર સાયન્સ એન્ડ ઈન્ફોર્મેશન ટેકનોલોજી વિદ્યાશાખા
૩) પરીક્ષા નિયામકશ્રી, પરીક્ષા વિભાગ, વીર નર્મદ દ. ગુ. યુનિવર્સિટી, સુરત.

...તરફ જાણ તેમજ અમલ સારૂ.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2019

Name of Program	Bachelor in Computer Science
Abbreviation	B.Sc.(Computer Science)
Duration	3 Years (Full Time – Regular Course)
Eligibility	Candidate must have passed standard 12th (H.S.C.) Examination in Science stream through Gujarat Higher Secondary Board (G.H.S.E.B.) or any other equivalent board (C.B.S.E. / I.C.S.E.) with English subject. Students passed with vocational stream in 12^{th}(H.Sc.) are also eligible. Candidate passed ITI and Diploma are eligible as per the norms of Gujarat Government.
Objective of the Program	The basic objective of the program is to open a channel of admission for computing courses for students, who have done the 10+2 and are interested in taking computing/IT as a career. The program caters to the needs of the students aspiring to excel in the fields of computers. The program is designed to develop computer professionals versatile in almost all field of computer application .The main emphasis of the course is preparing students in the field of computer science and application areas of computer science including software development skills.
Program Outcome	It will open field for the aspiring students to opt further career or masters' level study in the fields of Research, design, Architecture and software development. It is also preparing aspiring students to work in companies at entry levels and also independently.
Medium of Instruction	English
Program Structure	Three years of Graduate level course comprises of six semesters.

Course Structure for Third Year B.Sc.(Computer Science) Semester-V

Course	Paper Code	Paper Title	Theory (Marks)		Practical (Marks)		Total Credits
			Internal	External	Internal	External	
Core Compulsory	501	Software Engineering	20	50	0	0	18
	502	Computer Networking	20	50	0	0	
	503	Computer Graphics	20	50	0	0	
	504	Java Programming – I	20	50	10	20	
	505	PHP Programming - I	20	50	10	20	
	506	Python Programming	20	50	10	20	
		Minor Project	-	-	30	60	
Generic Elective	507-1 507-2 507-3 507-4	Open Source Tools Operation Research System Software Introduction of Data warehousing & Data mining	20	50	NIL	NIL	2
Foundation Compulsory			20	50	NIL	NIL	2
Foundation Elective (to be selected from NCC / NSS / Saptadhara)			NIL				2
Total:			**170**	**420**	**60**	**120**	**24**

For Practical:

1. Batch Size – 20 Maximum
2. In case of more than 10 students in a batch, separate batch should be considered.
3. The journal should be certified by the concerned faculty and also by the Head of the Department, failing which the student should not be allowed to appear for External Practical Examination.
4. In House minor project will be carried out and internal guide will supervise the project work.

P.N.: In case of Generic Elective Paper available in both semesters, it can be opted only during one semester. The same title cannot be repeated in another semester.

Course Code	Theory		Practical		University Examination (Theory + Practical)		Internal Marks	Total Marks
	Credit	Hours	Credit	Hours	Duration	Marks		
501	2	2	-	-	2	50	20	70
502	2	2	-	-	2	50	20	70
503	2	2	-	-	2	50	20	70
504	2	2	1	2	2 + 2	50 + 20	20 + 10	100
505	2	2	1	2	2 + 2	50 + 20	20 + 10	100
506	2	2	1	2	2 + 2	50 + 20	20 + 10	100
507	2	3	-	-	2	50	20	70
Minor Project	-	-	3	6		60	30	90
Foundation Compulsory	2	2	-	-	2	50	20	70
Foundation Elective	2	-	-	-		-	-	-
Total:	**18**	**17**	**6**	**12**		**520**	**220**	**740**

Course Structure for Third Year B.Sc.(Computer Science) Semester-VI

Course	Paper Code	Paper Title	Theory (Marks)		Practical (Marks)		Total Credits
			Internal	External	Internal	External	
Core Compulsory	601	Cloud Computing fundamentals	20	50	0	0	18
	602	PHP Programming-II	20	50	10	20	
	603	Software Test automation	20	50	0	0	
	604	Java Programming – II	20	50	10	20	
	605	Fundamentals of Mobile Programming	20	50	10	20	
	606	Operating System	20	50	0	0	
		Major Project	-	-	30	60	
Generic Elective	607-1 607-2 607-3	Software Quality Assurance Organizational Structure & Behaviour Information System	20	50	NIL	NIL	2
Foundation Compulsory			20	50	NIL	NIL	2
Foundation Elective (to be selected from NCC / NSS / Saptadhara)			NIL				2
Total:			**160**	**400**	**60**	**120**	**24**

For Practical:

1. Batch Size – 20 Maximum
2. In case of more than 10 students in a batch, separate batch should be considered.
3. The journal should be certified by the concerned faculty and also by the Head of the Department, failing which the student should not be allowed to appear for External Practical
4. In-house Major Project can be carried out and internal guide will supervise the project work during the Project hours allotted.

Course Code	Theory		Practical		University Examination (Theory + Practical)		Internal Marks	Total Marks
	Credit	Hours	Credit	Hours	Duration	Marks		
601	2	2	-	-	2	50	20	70
602	2	2	1	2	2 + 2	50 + 20	20 + 10	100
603	2	2	-	-	2	50	20	70
604	2	2	1	2	2 + 2	50 + 20	20 + 10	100
605	2	2	1	2	2 + 2	50 + 20	20 + 10	100
606	2	2	-	-	2	50	20	70
607	2	3	-	-	3	50	20	70
Minor Project	-	-	3	6	-	60	30	90
Foundation Compulsory	2	2	-	-	2	50	20	70
Foundation Elective	2	-	-	-	-	-	-	-
Total:	**18**	**17**	**6**	**12**	-	**520**	**220**	**740**

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2019

Course: 501: Software Engineering

Course Code	501
Course Title	Software Engineering
Credit	2
Teaching per Week	2 Hrs
Minimum Weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	June 2019
Purpose of Course	Computer software engineers apply the principles and techniques of computer science, engineering, and mathematical analysis to the design, development, testing, and evaluation of the software and the systems that enable computers to perform their many applications.
Course Objective	1. To make students understand how to develop software. 2. To make students understand various components of software process model and their working. 3. To make students understand the importance of requirement analysis. 4. To make students understand various approaches of system design.
Pre-requisite	Prior knowledge of basic software
Course outcome	After studying this course, students will be able to understand how software is developed and importance of various aspects of software engineering. This course will also help students appreciate the role of various design principles. After successful completion students will be able to perform requirement analysis and system design for their applications.
Course Content	**Unit 1. Introduction to Software Engineering** 1.1 Software 1.1.1 Software & Software Types 1.1.2 Software characteristics & problems 1.1.3 Software quality factors 1.2 Software Engineering & problem related to it 1.3 Software engineering approach 1.3.1 Introduction to phased development approach 1.3.2 Introduction to effort distribution 1.4 Software process models - Linear sequential / waterfall model, Prototype model, RAD model, Incremental model, Spiral model. **Unit 2. Software Requirement analysis & specification** 2.1 Requirement gathering formal & informal techniques 2.1.1 Interviews, Questionnaires, System walk through, Document survey 2.1.2 Introduction to FAST , QFD & JAD 2.2 Requirement modeling 2.2.1 Data Modeling - Data, attribute, relationship, Entity Relationship Diagram. 2.2.2 Functional modeling – DFD & process specification 2.2.3 Data Dictionary 2.3 Software Requirement Specification

	2.3.1 Structure & Component of SRS 2.3.2 Characteristics of SRS **Unit 3. Software Designing** 3.1 Introduction to Design - Importance of design, Relationship between analysis & design, Design Principals 3.2 Design Concepts 3.2.1 System level design concepts – Abstraction, Refinement , Modularity, Information hiding, Polymorphism and reusability 3.2.2 Module level design concepts – Coupling, Cohesion 3.3 Detailed Design 3.3.1 Database design - Normalization, Indexing, constraints 3.3.2 Overview of Designing software architecture 3.3.3 UI / UX Design guidelines 3.3.4 Procedural design - PDL, Decision table **Unit 4. Software implementation and Project management** 4.1 Programming practices - Pair programming, Extreme programming, Coding rules and guidelines. 4.2 Project management 4.2.1 Software estimation - COCOMO Model – II 4.2.2 Project scheduling and tracking - Time line charts and project table. 4.2.3 Software team management - CC, CD, DD team structure 4.2.4 Software project maintenance
Reference Books	1 Integrated Approach to Software Engineering Pankaj Jalote Narosa Publication. 2 Software Engineering: A Practitioner's Approach 4e/5e, Roger S. Pressmann McGrawHill Publication. 3 Workbook on System Analysis and Design 1e/2e, Garg, Srinivasan PHI. 4 Software Engineering K. K. Aggrawal, Yogesh Singh New Age International Publishers. 5 Fundamentals of Software Engineering Carlo Ghezzi, Mehdi Jazayeri, Dino Mendrilo PHI. 6 Software Engineering Ian Summwerville Addison Wesley- Pearson Education. 7 Software Engineering K. L. James PHI. 8 System Analysis and Design Elias M. Awad Galgotia Publication. 9 System Analysis and Design in a changing world John W. Stazinger, Robert B. Jacobson, Stephen D Burd, Thomson Learning.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)

Syllabus for T. Y. B. Sc. Semester-V

Effective From: June-2019

Course: 502: Computer Networking

Course Code	502
Course Title	Computer Networking
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts the knowledge of Fundamentals of Computer Networks.
Course Objective	Students should be exposed to fundamentals of computer networks and should be able to understand computer network related protocols and activities.
Pre-requisite	Basic Knowledge of Computer Organization
Course Out come	• Students should be able to identify various network types and their benefits and limitations. • Students should be able to identify various networking devices and their functions • Students should be able to understand network activities at various OSI layers.
Course Content	**1 Network Fundamentals** 1.1 Introduction to Networks, types of networks, Need, Uses and advantages of Network. 1.2 Networking topologies 1.3 Client/Server, hybrid and Peer-Peer network 1.4 Data communication fundamentals - Signals, Bandwidth, Frequency, Simplex and duplex communication, Multiplexing. **2 OSI Model and related network infrastructure** 2.1 OSI Model & services of each layer 2.2 Physical and DataLink Layer- MAC and LLC sub layer, CSMA/CD, CSMA/CA, IEEE 802 Standards, Transmission media, NIC, Repeaters, Hubs, Bridges. 2.3 Network and transport Layer - Concept of logical addressing, Switching & Routing, L2-L3 Switches and Routers 2.4 OSI Model Upper Layer - Session management, FTP, NFS, Proxy and Gateway **3 Basics of TCP/IP** 3.1 The TCP/IP protocol layer 3.2 IP addressing –IP Subnets –IP routing 3.3 Method of delivery–Unicast, Boradcast, Multicast and Anycast. 3.4 ICMP protocol , ARP protocol 3.5 Concepts of Port and Sockets.

	3.6 User Datagram Protocol 3.7 TCP protocol - Features, Connection and Segment, Flow control, error control, Congestion control **4. Internet Basics and Email services** 4.1 DNS – Namespace, Resource records, DNS Query, Name servers 4.2 HTTP 4.3 Email Architecture and Services 4.4 Email Protocols - SMTP, POP3, IMAP
Reference Books:	1. Networking Complete Third edition, BPB Publication 2. Mastering Local Area Networks, Christa Anderson & Mark Minasi BPB Publication 3. Networking Essentials Study Guide, MCSE TataMcGrawHill Publication 4. Computer Networks, TenanBaum PHI 5. Data communication & N/W, B. Forouzan, TataMcGrawHill Publication 6. Internetworking with TCP/IP – Principles, Protocols and Architecture Fifth Edition Douglas Comer, PHI 7. TCP/IP Illustrated, Volume – 1, W. Richard Stevens, G. Gabrani – Pearson 8. Computer Networks Bhushan Trivedi, Oxford 9. Computer Networks Sanjay Sharma Katson Books 10. Introduction to Data and Network Communications by Michel Miller Gengage Learning 11. Fundamental of Computer Network second edition by Sudakshina Kundu PHI 12. Understanding TCP/IP A clear and comprehensive guide to TCP/IP protocols By Libor Dostalek and Alena Kabelova Packt publishing

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)

Syllabus for T. Y. B. Sc. Semester-V

Effective From: June-2019

Course: 503: Computer Graphics

Course Code	503
Course Title	Computer Graphics
Credit	3
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	Fundamental knowledge about Computer Graphics with practical implementation.
Course Objective	To provide basic concepts of graphics Implementation of basic objects practically Understand the geometry of shapes To understand graphic shadings and file formats
Pre-requisite	Basic knowledge about the Graphics and computer graphics.
Course Out come	At the end of this course, student will be able to understand various algorithms pertaining to Graphics primitive objects. Implementation of various algorithms and graphics file primitives. It also cover geometrical transformations and their implementations.
Course Content	**1.Overview of Computer Graphics and Graphics primitives** 1.1 Overview of Computer graphics 1.1.1 Historical background of computer Graphics 1.1.2 Applications of Computer Graphics 1.1.3 Popular graphics software 1.1.4 Pixel graphics versus Vector Graphics 1.1.5 Hard copy graphics Devices 1.2. Graphics primitive 1.2.1 Line Drawing Algorithms 1.2.1.1 Vecgen Algorithm 1.2.1.2 Brasenham Line Drawing Algorithm 1.2.2 Circle generating algorithms 1.2.2.1 Parametric circle drawing algorithm 1.2.2.2 Brasenham circle algorithm 1.2.3 Different line styles 1.2.3.1 Thick line 1.2.3.2 Line caps 1.2.3.3 Thick line joins 1.2.3.4 Pens and Brushes 1.2.4 Curves - DDA approach for drawing a circular arc 1.2.5 Text and Character Attributes 1.2.6 Anti Aliasing **2. Polygons** 2.1 Polygon formation 2.2 Polygon inside tests 2.2.1 Even – odd method 2.2.2 Winding number method 2.2.3 Some other method for performing inside test

	2.3 Polygon area filling 2.3.1 Flood fill method 2.3.2 Scan line fill method 2.3.3 Boundary fill **3. Geometric Transformation** 3.1 Basic transformation - Scaling, Translation, Rotation 3.2 Homogeneous Coordinates 3.3 Rotation relative to and Arbitrary point 3.4 Some other transformations: Reflection, Sharing 3.5 Coordinate Transformation 3.6 Inverse Transformation 3.7 Affine Transformation 3.8 Raster Transformation **4. Viewing in two dimensions and Visual Realism** 4.1 Window and View port 4.2 Viewing Transformation 4.3 Clipping 4.3.1 Point Clipping 4.3.2 Line Clipping 4.3.3 Polygon Clipping 4.3.4 Text Clipping 4.4 Sutherland – Hodgman Polygon clipping algorithm 4.5 Visual Realism 4.5.1 Light Sources, 4.5.2 Illumination, 4.5.3 Shading, 4.5.4 Transparency, 4.5.5 Shadow, 4.5.6 Colors 4.5.7 Graphics File formats: Bitmap, JPEG, GIF, PNG
Reference books	1) Computer Graphics, Donald Hearn, M Pauline Baker, PHI, New Delhi 2) Computer Graphics : Dr A A Desai, PHI 3) Computer Graphics, Herrington, PHI, New Delhi 4) Principle of Computer Graphics, Newman & Sproul, McGraw Hill 5) Interactive Computer Graphics, Giloi W K , PHI, New Delhi 6) Mukherjee & Jana : Computer Graphics : Algorithms & Implementations, PHI 7) Giloi W.K.: Interactive Computer Graphics – Prentice Hall India 8) New Man W. & Sproul P.F. - Principles of Interactive Computer Graphics, McGraw Hill. 9) Rogers D.F. – Procedural Elements for Computer Graphics McGraw Hill

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-V
Effective From: June-2019
Course: 504: Java Programming - I

Course Code	504
Course Title	Java Programming – I
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	To teach object oriented programming concepts through programming using Java as the computer Programming language.
Course Objective	1. To make students understand object oriented programming. 2. To make students understand various inbuilt java classes those are available along with its working. 3. To make students understand the importance of OOP methodology. 4. To make students understand various types of OOP programming techniques.
Pre-requisite	Fundamentals of Object Oriented Programming Language. Knowledge of C and C++.
Course Out come	Students will have knowledge about the Platform independent OOPs language and its concepts. Various features of java like exception handling, garbage collection, class structures of java and OOPS features in java.
Course Content	**Unit 1. Introduction to Java** 1.1. Properties of Java 1.2. Comparison of java with C++ 1.3. Java Compiler and Interpreter 1.4 Use of JDK, JVM, JIT, JRE 1.5 Garbage Collection **Unit 2. Basic Concepts** 2.1. Identifier, Literals, Operators, Variables 2.2. Keywords, static and instance variables 2.3. Data Types and wrapper class 2.4. Branching: If – Else, Switch 2.5. Looping : While, Do-while , For 2.6. Type Casting 2.7. String and String Buffer class 2.7.1. Basic String operations 2.7.2. String comparison, concatenation 2.7.3. Important functions of String Buffer class. **Unit 3. Classes and Objects** 3.1. java class structure, Inheritance and Access Control 3.2. Polymorphism: Overriding and overloading. 3.2.1 this and super 3.3. Construction and Initialization 3.4. Concepts of Data Hiding and Encapsulation, Access control 3.5. final, finalize(), finally, transient, volatile, memory leak 3.6. Static members, static class 3.7. Concept of Abstract class 3.8. Interfaces 3.8.1. Introduction to Interfaces.

	3.8.2. Interface Declaration, implementing and extending. 3.8.3. Difference between Abstract class and Interfaces. 3.9 Packages 3.9.1 Package Naming, Type Imports 3.9.2. Package Access, Contents, Defining and Importing Package **Unit-4: Exception Handling:** 4.1. Concepts of Exception Handling, try…catch block. 4.2 Types of Exceptions: 4.2.1 Uncaught exceptions, Nested try block 4.2.3 Throw clause 4.2.4 Finally clause 4.2.5 Difference between : Error and Exception, Checked and Unchecked Exceptions, Throw and Throws.
Reference Books:	1.The Complete Reference Java2 Herbert Schildt TMH, New Delhi 2. Mastering JAVA2 John Zukowski BPB 3. Teach Yourself Java2 platform in 21 days Lamey & Cadenhead Teach Media 4 Java in Nut shell - O'Relly Publication 5 Java Language Reference - O'Relly Publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-V
Effective From: June-2019
Course: 505: PHP Programming - I

Course Code	505
Course Title	PHP Programming - I
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	Understand concept of server side scripting language and implementing it practically. Learning fundamentals of dynamic website development using open source technology.
Course Objective	1. To make students understand Open source website development.. 2. To make students understand various inbuilt features of PHP and in-built functions. 3. Fundamentals of dynamic website development. 4. Using database like MySQL.
Pre-requisite	HTML, DHTML and fundamentals of Client side scripts.
Course Out come	Students will have knowledge about the Platform independent server side scripting language and developing steps to generate dynamic interactive basics of websites.
Course Content	**Unit-1 Introduction to PHP and Scripting** 1.1. Installation of PHP, MySQL and Apache Web Server 1.2 PHP Features 1.3 PHP code parsing 1.4 Embedding PHP and HTML 1.5 Executing PHP script 1.6 Data types, Operators 1.7 PHP variables: static and global variables 1.8 Comments in PHP **Unit-2 : PHP Scripting** 2.1 Control Structures and Looping 2.2 Array in PHP 2.3. Exit, Die, Return 2.4 Working With Data 2.5 FORM element, INPUT elements 2.6 Validating the user input 2.7 Passing variables between pages 2.8 Passing variables through GET , POST, REQUEST 2.9 State management 2.9.1 Managing Sessions - Concept of Session, Starting session, Modifying session variables, Un registering and deleting session variable 2.9.2 Managing Cookies - Concept of cookie, Using cookie in PHP **3. PHP Functions** 3.1. Built-in functions 3.1.1. Sring Functions: chr, ord, strtolower, strtoupper, strlen, ltrim, rtrim, substr, strcmp, strcasecmp, strpos, strrpos, strstr, stristr, str_replace, strrev, echo, print 3.1.2. Math Functions: abs, ceil, floor, round, fmod, min, max, pow, sqrt, rand

	3.1.3. Array Functions: count, list, in_array, current, next, previous, end, each, sort, rsort, assort, array_merge, array_reverse 3.2. User Defined Functions **Unit-4: Using MySQL** 4.1 Types of tables in MySQL 4.2 Database connectivity of PHP with MySQL 4.3 Query in MySQL: Select, Insert, Update, Delete 4.4 Using AJAX with PHP and database 4.5 Using JSON with PHP and MYSQL **Note: Practical should be performed based on all above units.**
Reference Books:	1.Core PHP Programming ;Leon Atkinson ;Pearson publishers 2 The Complete Reference PHY; Stever Holzner; McGraw Hill 3 Beginning PHP 5.0 Database; Christopher Scollo, Harish Rawat, Deepak Thomas; Wrox Press 4 PHP – A beginners; Ashok Appu; Wiley 5 PHP 5.0 and MySql Bible; Tim Converse, Joyce Park, Clark Morgan John; Wiley & Sons 6 MySQL Bible; Steve Suehring John; Wiley &Sons 7 PHP Black Book; Peter Moulding – 8 PHP 5 and Mysql; Tim converse, Joyce Park and Clark Morgan; Bible Wiley 9 Beginning PHP 5.3; Matt Doyle; Wrox Publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)

Syllabus for T. Y. B. Sc. Semester-V

Effective From: June-2019

Course: 506: Python Programming

Course Code	506
Course Title	Python Programming
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	Newly introduced subject
Purpose of Course	The purpose of the course is to make students capable of implementing Basic concepts, methods and tools of python programming.
Course Objective	To make students learn of python programming skill for high level computational programming.
Pre-requisite	The basic knowledge of C and C++ and object oriented programming is required.
Course Out come	After completion of this course, the student will be capable to develop, manage and maintain basic applications using Python.
Course Content	**Unit 1 Introduction to Python** 1.1 Python History and Usability 1.1.1 Application area's of Python 1.1.2 Technical Strengths of Python 1.2 Program Execution in Python - Program Execution, Python Virtual Machine (PVM) **1.3** IDLE of Python, Jupyter Notebook **Unit 2 Python Object Types and Operations** 2.1 String : Indexing, Slicing, Text Parsing 2.2 List : Indexing, Slicing and Merging List 2.3 Dictionaries : Add, Update, Remove and Sort 2.4 Arrays and Matrices : Sorting and Searching 2.5 File Handling using Python **Unit 3 Python Programming Statements** 3.1 Comments, Indentations, Exception Handling 3.2 Assignment, Expressions, and print 3.3 Branching and Looping - if , while and For loops 3.4 List and Dictionary Traversal **Unit 4 Functions, Modules and Libraries** 4.1 Function Basics 4.1.1 Definition, Call, Passing Arguments 4.1.2 Lambda Functions

	4.2 Modules 4.2.1 Python program structure 4.2.3 Import and Attributes 4.2.5 Module Creation and Usage 4.3 Useful Python Libraries 4.3.1 Introduction to NumPy 4.3.2. Introduction to Web Development Frameworks 4.3.2.1 Flask 4.3.2.2 Django 4.3.3 GIS Web Services
Reference Book	1. Learning Python -Mark Lutz : O'Reilly Media 2. Core Python Programming – by Wesley J Chun ISBN-13: 978-0132269933 3. Python for Everybody: Exploring Data in Python 3, by Charles Severance (Author), Aimee Andrion (Illustrator), Elliott Hauser (Editor), Sue Blumenberg (Editor) 4. An Introduction to Python - by van Rossum Guido ISBN: 9780954161767, 0954161769 5. Core Pyhton Applicaiton Programming – by Wesley J Chun Prentice Hall
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

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-V
Effective From: June-2019
Course: GENERIC ELECTIVE (IDS) – 507-1

Course Code	**507-1 GENERIC ELECTIVE (IDS)**
Course Title	**Open Source Tools**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts the knowledge of open source technologies and it's development process and understanding of open source graphical tool GIMP.
Course Objective	To have awareness of open source technologies and development process. To get understanding on open source graphical tool GIMP.
Pre-requisite	NIL
Course Out come	After completion of this course Students should have knowledge about open source technologies and softwares and students should get understanding on open source graphical tool GIMP.
Course Content	**1. Introduction to Open Source** 1.1 .Open Source: Meaning, Need, History and Principles 1.2. Success of Open Source 1.3 .Free Software and Open Source Software 1.4. FOSS 1.5. Open Source Initiative and Open Source Standards 1.6. Software Freedom and Open Source Software Development **2. Open Source Projects** 2.1. Open Source Project Development Process 2.2. Open Source Project Maintenance 2.3. Open Source Hardware 2.4. Open Source Design 2.5. Open Source Teaching Platform 2.6. Case Study of Linux Project **3. Ethics and Economies of Open Source** 3.1. Open Source and Closed Source Software 3.2. Open Source Government 3.3. Ethics of Open Source and Social Impact, Share Software and Resources 3.4. Shared Software and Shared Sources **4. GIMP Basics** 4.1. GIMP Basics, GIMP Windows and Dialogs: Toolbox, Image Window, Layers, Channels, Paths Dialogs, The Dialogs for Color, Brushes, Patterns, Gradients, and Palettes 4.2. Loading, Saving and Creating New Images, RGB, Grayscale, and Indexed Images

	4.3. Layers and the Role: Layers Dialog and Layers Menu, Channels and their Relationship to Layers, Channels Dialog 4.4. Conversions of Selections, Channel Masks, Layer Masks, and Alpha Channels, Masks and Selection
Reference Books	1. Open Source Technology, Kailash Vadera & Bhavyesh Gandhi, University Science Press, Laxmi Publications 2. Grokking the GIMP, Carey Bunks , New Riders Publishing 3. Open Source Technology and Policy, Fadi Greek & James Hugh , Cambridge University Press 4. Open Source for the enterprise, Dan Woods, Gautam Guliani, O'Reilly 5. http://www.gimp.org/tutorials/ 6. GIMP for Absolute Beginners, Jan Smith, Roman Joost , Apress 7. GIMP, Olivier Lecarme, Karine Delvare , Pearson Education

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019
Course: 507-2 : OPERATION RESEARCH

Course Code	**507-2 GENERIC ELECTIVE (IDS)**
Course Title	**OPERATION RESEARCH**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts knowledge of mathematical model formulations and finding optimize solution of real world problem.
Course Objective	To introduce basic understanding of mathematical model formulation and finding optimize solution of real world problem with applications and give idea of game theory.
Pre-requisite	NIL
Course Out come	Student should be able to get basic understanding of mathematical model formulation and able to find optimize solution of real world problem.
Course Content	**1: Linear Programming Problem (LPP) and Simplex Method:** 1.1 Model Formulation Basic, 1.2 Non-basic, Degenerate, 1.3 Non-Degenerate and basic feasible Solution of LPP in the Standard Matrix form , 1.4 Graphical Solution. 1.5 Simplex Method **2: Transportation Problem** 2. 1 Transportation Problem, 2.2 Method for finding initial basic feasible Solution, 2. 3 Optimal Solution of TP Problem by MODI method, 2.4 Unbalanced Transportation Problem. 3: **Assignment Problem:** 2.1 Assignment problem, 2.2 The Hungarian method, Balanced & Unbalanced Assignment Problem. **4: Game Theory:** 4.1 Competitive Problem, 4.2 Two-persion zero –sum game, 4.3 Maximin and Minimax Principle, 4.4 Saddle point and the Value of the game(based on pure Strategies) 4.5 Mixed strategies , 4.6 Solution of games with saddle point , 4.7 Dominance rule
Reference Books:	1. OR Theory & Application , J.K Sharma , Mac Millian India

	Ltd.,1998 2. Operation Reasearch , Kanti Swaroop ,P.K.Gupta & Man Mohan , S.Chand & Son ,New Delhi,1098 3. Linear Programming, G.Handley , Narsa Publication House ,New Delhi,1995 4. Linear Programming, Transportation, Assignment, G.Paria , Books & Allied Pvt.Ltd.Calcutta-9 5. Linear Programming , P.M. Karak , New Central Book Agency Pvt.Ltd 6. Optimization method in O.R and System Analysis , K.V.Mittal & L.Mohan , New Age International Publications. 7. O.R. , Goel & Mittal , Pragati Prakashan ,Meerut.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019
Course: 507-3 : System Software

Course Code	**507-3 GENERIC ELECTIVE (IDS)**
Course Title	**System Software**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts knowledge of System Softwares and Language processing activities and idea of assemblers , compilers and interpreters.
Course Objective	To Give idea of System Softwares and Language processing activities and idea of assemblers , compilers and interpreters.
Pre-requisite	Basic idea of Fundamentals of computers and basic knowledge of computer programming
Course Out come	Students should get idea of System Softwares and Language processing activities and idea of assemblers , compilers and interpreters.
Course Content	**1. Introduction to system software and Language Processing** 1.1 System Software & its characteristics 1.2 Overview of System Software Categories 1.3 Language Processing Activities 1.3.1 Program Generation 1.3.2 Program Execution-Translation & Interpretation 1.4 Passes and Phases of Language Processor 1.4.1 Intermediate Representation of Program 1.4.2 Lexical Analysis-scanning 1.4.3 Syntax Analysis-parsing 1.4.4 Semantic analysis 1.4.5 Memory Allocation 1.4.6 Code Generation 1.5 Fundamentals of Language Specification 1.5.1 Programming Language Grammar, its classification,ambiguity in Grammatical Specification & its elimination 1.5.2 Binding and Binding Times **2 Assemblers** 2.1 Instruction formats, Addressing Modes and program Relocation 2.2 Literals, symbols, expressions, program blocks, control section and program linking 2.3 Design of a One pass /Single pass assembler

	3. Compilers and Interpreters 3.1 Introduction to data types, data structures, scope rules and control structures 3.2 Basic Compiler Functions-Grammars, Lexical Analysis, Syntactic Analysis and Code Generation 3.3 Introduction to memory allocation 3.4 Compilation of expressions 3.5 Compilation of Control structures 3.6 Code Optimization 3.7 Interpreters, P-code Compilers & Compiler –compilers **4. Loaders & Linkers** 4.1 Basic Loader Functions 4.2 Relocation and Linking Concepts 4.3 Design of a loader / linker
Reference Books:	1. System Programming and Operating Systems , D M Dhamdhere , Tata McGrawhill Publication 2. System Software- An introduction to Systems Programming , Leland L. Beck & D Manjula , Pearson Education 3. System Software- An introduction to Systems Programming , Leland L. Beck , Addision Wesley 4. Compiler Design , Chattopadhyay Santanu , PHI 5. Engineering a compiler , Cooper Keith , Elsevier(Academic Press) 6. Compiler Construction: Principles and Practices , Louder Kenneth C , Cengage Learning

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)

Syllabus for T. Y. B. Sc. Semester-V

Effective From: June-2019

Course: GENERIC ELECTIVE (IDS) – 507-4

Course Code	**507-4 GENERIC ELECTIVE (IDS)**
Course Title	**Introduction of Datawarehousing & Datamining**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts the knowledge of Data Warehousing and Data processing and its phases. It also imparts knowledge of associative rules, classification and clustering in large datasets.
Course Objective	To have awareness .of what of Data Warehousing and Data processing and its phases and give idea of associative rules, classification and clustering in large dataset.
Pre-requisite	Students should have Basic knowledge of DBMS and RDBMS
Course Out come	Students should have awareness of What Data Warehousing and Data processing and its languages and student should get idea of associative rules, classification and clustering in large dataset. .
Course Content	**1. INTRODUCTION AND DATA WAREHOUSING** 1.1 Introduction, 1.2 Data Warehouse, 1.3 Multidimensional Data Model, 1.4 Data Warehouse Architecture, 1.5 Implementation 1.6 Data Warehousing to Data Mining **2. DATA PREPROCESSING, LANGUAGE, ARCHITECTURES, CONCEPT DESCRIPTION** 2.1 Preprocessing, Cleaning, Integration, Transformation, Reduction, Discretization, 2.2 Concept Hierarchy Generation, Data Mining Primitives, Query Language, 2.3 Graphical User Interfaces, Architectures, 2.4 Concept Description, Data Generalization, Characterizations. **3. ASSOCIATION RULES** 3.1 Association Rule Mining, 3.2 Single-Dimensional Boolean Association Rules from Transactional Databases **4. CLASSIFICATION AND CLUSTERING** 4.1 Classification and Prediction,

	4.2 Issues, Decision Tree Induction, 4.3 Bayesian Classification, Association Rule Based, 4.4 Prediction, 4.5 Types of data, Categorization of methods.
Reference Books	1. Data Mining: Concepts and Techniques, J. Han, M. Kamber , Harcourt India / Morgan Kauffman, 2001. 2. Data Mining: Introductory and Advanced Topics , Margaret H.Dunham , Pearson Education 2004 3. Data Warehousing in the real world , Sam Anahory, Dennis Murry , Pearson Education 2003 4. Principles of Data Mining , David Hand, Heikki Manila, Padhraic Symth , PHI 2004. 5. Building the Data Warehouse 3rd Edition , W.H.Inmon , Wiley, 2003. 6. Data Warehousing, Data Mining & OLAP , Alex Bezon, Stephen J.Smith , MeGraw-Hill Edition,2001 7. Data Warehousing Fundamentals , Paulraj Ponniah , Wiley-InterscicencePublication, 2003

Course Structure for Third Year B.Sc.(Computer Science) Semester-VI

Course	Paper Code	Paper Title	Theory (Marks)		Practical (Marks)		Total Credits
			Internal	External	Internal	External	
Core Compulsory	601	Cloud computing fundamentals	20	50	0	0	18
	602	PHP Programming-II	20	50	10	20	
	603	Software Test automation	20	50	0	0	
	604	Java Programming – II	20	50	10	20	
	605	Fundamentals of Mobile Programming	20	50	10	20	
	606	Operating System	20	50	0	0	
		Major Project	-	-	30	60	
Generic Elective	607-1 607-2 607-3	Software Quality Assurance Organizational Structure & Behaviour Information System	20	50	NIL	NIL	2
Foundation Compulsory			20	50	NIL	NIL	2
Foundation Elective (to be selected from NCC / NSS / Saptadhara)			NIL				2
Total:			**160**	**400**	**60**	**120**	**24**

For Practical:

1. Batch Size – 20 Maximum
2. In case of more than 10 students in a batch, separate batch should be considered.
3. The journal should be certified by the concerned faculty and also by the Head of the Department, failing which the student should not be allowed to appear for External Practical
4. In-house Major Project can be carried out and internal guide will supervise the project work during the Project hours allotted.

Course Code	Theory		Practical		University Examination (Theory + Practical)		Internal Marks	Total Marks
	Credit	Hours	Credit	Hours	Duration	Marks		
601	2	2	-	-	2	50	20	70
602	2	2	1	2	2 + 2	50 + 20	20 + 10	100
603	2	2	-	-	2	50	20	70
604	2	2	1	2	2 + 2	50 + 20	20 + 10	100
605	2	2	1	2	2 + 2	50 + 20	20 + 10	100
606	2	2	-	-	2	50	20	70
607	2	3	-	-	3	50	20	70
Major Project	-	-	3	6	-	60	30	90
Foundation Compulsory	2	2	-	-	2	50	20	70
Foundation Elective	2	-	-	-	-	-	-	-
Total:	**18**	**17**	**6**	**12**	-	**540**	**230**	**740**

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science) Sem-VI
With effect from June 2019

Course: 601: Cloud Computing Fundamentals

Course Code	601
Course Title	Cloud Computing Fundamentals
Credit	2
Teaching per Week	2 Hrs
Minimum Weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Review / Revision	Newly introduced
Purpose of Course	To provide fundamental knowledge of cloud computing system
Course Objective	To provide comprehensive knowledge of cloud computing and aspects related to it.
Pre-requisite	Basic understanding of operating system and computer network
Course outcome	After learning the course, the student will be able: 1. To explain the core concepts of the cloud computing paradigm: how and why this paradigm shift came about, the characteristics, advantages and challenges brought about by the various models and services in cloud computing. 2. To discuss system virtualization and outline its role in enabling the cloud computing system model.
Course Content	**Unit 1: Introduction to cloud computing** 1.1 Introduction to Cloud Computing 1.2 History and Evolution of Cloud Computing, 1.3 Merits of Cloud computing 1.4 Obstacles for cloud technology, Cloud vulnerabilities, Cloud Migration 1.5 Cloud service provider – role and responsibility 1.6 Cloud service consumer – Expectations 1.7 Service level agreement (SLA) **Unit 2: Cloud system and Virtulization** 2.1 Types of clouds- Private Public, hybrid and community cloud 2.2 Cloud Computing architecture 2.3 Cloud computing infrastructure 2.4 Virtulization 2.4.1 Basics of Virtualization 2.4.2 Types of Virtualization 2.4.3 Virtualization of CPU, Memory, I/O Devices 2.5 Virtual Clusters and Resource management

	Unit 3: Introduction to Cloud computing delivery models and services 3.1 Iaas – Use, Merits and Demerits of Iaas, Characteristics, Application of Iaas : Azure, 3.2 Paas – Use, Merits and Demerits ,Characteristics , Applications : Azure, Google AppEng 3.3 SaaS – Use, Merits and Demerits, Characteristics, Application : Google Apps, Salesforce **Unit 4 Various aspects related to Cloud services** 4.1 Service oriented architecture 4.2 Diversified services 4.3 Performance issues in cloud computing services 4.4 Role of data centre in cloud services 4.5 Legal issues in cloud computing service provision
Reference Books	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 10. Amazon Web Services For Dummies. Bernard Golden. For Dummies. ISBN-13: 978- 1118571835

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 602: PHP Programming – II

Course Code	602
Course Title	PHP Programming – II
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	Newly introduced
Purpose of Course	To provide practical knowledge of PHP Programming and CMS
Course Objective	To provide comprehensive practical knowledge of CMS and PHP scripting
Pre-requisite	Knowledge of Core PHP Programming
Course Out come	After completing this subject student should be able to manage CMS
Course Content	**Unit-1 : Introduction to object Oriented Programming in PHP** 1.1. Introduction to Objects 1.2. Declaring a class 1.3. The new keyword and constructor 1.4. Destructor 1.5. Access method and properties using $this variable 1.6. Public, private, protected properties and methods 1.7. Static properties and method 1.8. Class constant 1.9. Inheritance & code reusability 1.10 File uploading and downloading in PHP **2. Errors and Exception handling in PHP** 2.1 PHP error categories and levels 2.2 Error Reporting and custom error handler 2.3 Try …catch statement for Exception handling 2.4 Generic Exception class and its sub classes **3. CMS- Wordpress** 3.1 WordPress Introduction 3.1.1 Understanding and Using domain names 3.1.2 WordPress Hosting Options 3.1.3 Installing WordPress on a Dedicated Server 3.1.4 Understanding Directory Permissions 3.2 Basics of the WordPress User Interface 3.2.1 Understanding the WordPress Dashboard 3.2.2 Pages, Tags, Media and Content Administration 3.2.3 Core WordPress Settings 3.3 WordPress Plugins 3.3.1 Finding and Installing Plugins Quickly and Easily 3.3.2 Upgrading WordPress Plugins 3.3.3 Recommended WordPress Plugins

	Unit 4 Working with WordPress Themes 4.1 Understanding the Structure of WordPress Themes 4.2 Finding Themes and Choosing the Right One 4.3 Installing and Configuring Themes 4.4 Editing and Customizing Themes 4.5 Using Theme Frameworks and Parent-Child Themes 4.6 Theme Best Practices 4.7 WordPress Content Management 4.7.1 Understanding Posts Versus Pages 4.7.2 Organizing Posts with Categories 4.7.3 Connecting Posts Together with Tags 4.7.4 Custom Post Types and Custom Taxonomies 4.7.5 Managing Lists of Links
Reference Books:	1.Core PHP Programming ;Leon Atkinson ;Pearson publishers 2 The Complete Reference PHY; SteverHolzner; McGraw Hill 3 Beginning PHP 5.0 Database; Christopher Scollo, Harish Rawat, Deepak Thomas; Wrox Press 4 PHP – A beginners; Ashok Appu; Wiley 5 PHP 5.0 and MySql Bible; Tim Converse, Joyce Park, Clark Morgan John; Wiley & Sons 6 MySQL Bible; Steve Suehring John; Wiley &Sons 7 PHP Black Book; Peter Moulding – 8 PHP 5 and Mysql; Tim converse, Joyce Park and Clark Morgan; Bible Wiley 9 Beginning PHP 5.3; Matt Doyle; Wrox Publication 10 WordPress for Beginners THE MISSING GUIDE, 2nd Edition , covering WordPress 3.5, By Nico Julius WPBRIX publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
S Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 603: Software Test Automation

Course Code	603
Course Title	Software Test Automation
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2019
Purpose of Course	This course imparts the knowledge of Software Testing. The concepts of software testing, role of testing, testing tools and reporting are covered in this course. The course is aimed to give inner depth of Software testing.
Course Objective	To make students understand concepts of testing and testing practices. To make students understand test automation process. To make students understand Testing tools. To make students writing and tracking test cases.
Pre-requisite	Concepts of Software Engineering
Course Outcome	At the end of the course, student is expected to have clear concepts about the software testing and able to create various test case and will able to use various testing tools.
Course Content	**Unit 1. Fundamentals of Testing** 1.1 Testing concepts 1.1.1 Terminology - Error, Fault, Failure, Bug, Cost of bug, Testing, Testcase, Test Data, Test Result, Test suite, Test Reports 1.1.2 Testing life cycle, Test Exit criteria 1.1.4 Testing and debugging, software reliability 1.1.5 Test driven development 1.2 Testing practices 1.2.1 Overview of testing types - Ad-hoc testing, Gorilla testing, Random testing and Systematic testing, Static testing and Dynamic Testing, Functional, Non functional and Behavioural Testing, Usability Testing, Configuration Testing and Compatibility Testing 1.2.2 White box testing - Data and code coverage testing techniques 1.2.3 Black box testing - Equivalence partitioning, Boundary value analysis 1.2.4 Levels of testing - Unit, Integration, System and Acceptance testing 1.2.5 Smoke testing, Sanity Testing and Regression Testing 1.2.6 Practices for static testing **Unit 2. Test Automation** 2.1 Manual Testing vs. Test Automation-advantages and limitations. 2.2 Automation of various testing activities and related test tools – Win runner, JMETER, Test director, IBM Rational, Load runner 2.3 Criteria for selecting test tools **Unit 3. Testing Tools-1** 3.1 Testing tools for White box testing 3.1.1 Testing tools for code coverage 3.1.2 Testing tools for Data coverage 3.2 Testing tools for Unit Testing

	3.2.1 Writing and executing test cases with NUnit- NUnit framework, Test Fixture, Test, Septp & Tear Down, Asserts and Exception 3.2.2 Writing and executing test cases with JUnit- JUnit framework, Test Fixture, TestCase, Septp & Tear Down, Asserts and Exception **Unit 4. Testing Tools-2** 4.1 Testing tool for Blackbox testing 4.1.1 Test recording and playback using Selenium 4.2 Testing tool for Bug tracking and Bug reporting-case study of BugZilla 4.3 Testing tool for Test Management- case study of Testlink
Reference Books:	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. K. Mustafa and R.A Khan, "Software Testing -concepts and practices", Narosa, 2012 5. Bill Hamilton, "NUnit: pocket Referance", SDP-OReilly, , 2004 6. Andrew Hunt and David Thomus, "Pragmatic Unit Testing in Java with JUnit", SPD, 2006 7. Testing with JUnit by Frank appeal PACKT Publishing 8. Software testing Principal and practices by Naresh Chauhan – OXFORD 9. Software testing (A Practical approach) by Rajiv Chopra – S K Kataria & Sons (KATSON Books) 10 Software testing and quality assurance Theory and practice by Kashirasagar Naik and Priyadarshini Tripathy – Wiley india Pvt Ltd. 11. Software testing by Hitesh Gupta – International book house P. ltd 12. Fundamentals of Software Testing by Aditya P. Mathur – Pearson
Teaching Methodology	Discussion, Seminars and Assignment
Evaluation Method	30% Internal assessment and 70% assessment is based on end semester written examination.

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 604: Java Programming - II

Course Code	**604**
Course Title	**Java Programming – II**
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	To teach advanced object oriented programming concepts through programming using Java as the computer Programming language.
Course Objective	1. To make students understand object oriented programming. 2. To make students understand various inbuilt java concepts like threads 3. To make students understand the GUI and concepts of APPLET. 4. To make students understand various components and their properties.
Pre-requisite	Fundamentals of Object Oriented Programming Language. Knowledge of Core Java.
Course Out come	Students will have knowledge about the Platform independent OOPs language and its concepts. Various features of java like Threads, Applet, various packages like AWT, graphics. Concepts of Swing and JDBC.
Course Content	**Unit 1. Concepts of Thread** 1.1. Basics of Thread 1.2. Thread Life cycle, working of Thread. 1.3. Creating Thread using Thread class and Runnable Interface. 1.4. Extending, Stopping and Pausing Threads. 1.5 Concepts of Daemon Thread. 1.6 Priority of Thread and Thread scheduling 1.7 Parallel execution of Thread in Synchronous and asynchronous mode. **Unit 2. GUI Programming using Java** 2.1 Applet 2.1.1 Introduction to applet 2.1.2 Difference between Applet and Application. 2.1.3 Life cycle of Applet 2.1.4 Invoking Applet, Passing parameters to Applet 2.2 Abstract Window Toolkit (AWT)- Component Class: Container, Panel, LayoutManager 2.3 UI Controls:- Lables, TextFields, CheckBoxes, RadioButtons, ChoiceList, ChoiceMenu, List 2.4 Event handling 2.4.1 Handling Button, Checkbox, RadioButton Events

	2.4.2 Handling Combobox, List, TextField, TextArea Events **Unit-3 JDBC and JSP** 3.1 Introduction to JDBC 3.1.1 Java database connectivity, Driver class 3.1.2 CRUD operations with Statement Object, PreparedStatement object, callable statement object 3.1.3 The ResultSet Object 3.2 Java Server Pages 3.2.1 Overview of Java Server Pages (JSP) & JSP lifecycle, 3.2.2 Directives - Page Directive, Include Directive, Taglib Directive 3.2.3 Scripting Elements-Comment Element, Declaration Element, Scriptlets , Expression Element 3.2.4 Standard Actions – include, forward, plugins **Unit - 4 Java Servlets** 4.1 Introduction to Java Servlets 4.2 The Java Servlet API 4.3 The Servlet Life Cycle 4.4 Request and Response 4.5 Getting Values from Forms and QueryStrings, 4.6 Working with Databases, Working with HTTP Headers
References Books:	1.The Complete Reference Java2 Herbert Schildt TMH, New Delhi 2. Mastering JAVA2 John Zukowski BPB 3. Teach Yourself Java2 platform in 21 days Lamey & Cadenhead Teach Media 4 Java in Nut shell - O'Relly Publication 5 Java Language Reference - O'Relly Publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 605: Fundamentals of Mobile Programming

Course Code	605
Course Title	Fundamentals of Mobile Programming
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June 2019
Purpose of Course	To introduce the most demanding and developing mobile app technology. Fundamentals of android open source technology.
Course Objective	1. To make students understand fundamentals of mobile app technology. 2. To make students understand various inbuilt features of android. 3. To make students understand the android design essentials. 4. To make students understand android user interface design basics .
Pre-requisite	Fundamentals of web technologies and fundamentals related to mobile OS.
Course Out come	Students will have knowledge about android which is widely used Mobile OS and open source technology and its concepts. Various features of android like Application Design Essentials, User Interface Design Essentials, Use of Common Android APIs, data storage using SQLite and deploying Android application.
Course Content	**Unit-1 :** 1. Introduction to Android 1.1 History of Mobile Software Development 1.2 The Open Handset Alliance 1.3 The Android Platform, Architecture 1.4 Android SDK 1.5 Building a sample Android application **Unit-2 :** 2. Android Application Design Essentials 1.1 Android Life Cycle 1.2 Android terminologies – Activity, Layout, Emulator, AVD, logcat, Gradle 1.3 Application Context, Activities Intents. 1.4 Android Manifest File and its common settings 1.5 Using Intent Filter, Permissions 1.6 Resource Management in Android. **Unit-3 :** 3. Android User Interface Design Essentials 1.1 UI elements – EditText, TextView, Button, RadioButton, CheckBox, Spinner, ListView, ProgressBar, ToggleButton 1.2 Designing User Interfaces with Layouts 1.2.1 Relative Layouts 1.2.2 Linear Layouts 1.2.3 Table Layouts

	Unit-4 : 4. Preserving and Saving data in Android 4.1 Shared preferences – Creating, Saving and Retrieving data 4.2 Managing data using SQLite – Creating database and performing CRUD operations 4.3 Preparing and using apk
References Books:	1. Lauren Darcey and Shane Conder, "Android Wireless Application Development", Pearson Education, 2nd ed. (2011) 2. http://developer.android.com/ **3.**Reto Meier, "Professional Android 2 Application Development", Wiley India Pvt Ltd (2011) 4.Mark L Murphy, "Beginning Android", Wiley India Pvt Ltd(2009) 5.Sayed Y Hashimi and Satya Komatineni, "Pro Android", Wiley India Pvt Ltd(2009)

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 606: Operating System

Course Code	506
Course Title	Operating System
Credit	2
Teaching per Week	2 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts the knowledge of operating system concepts
Course Objective	Provide fundamental principles of operating systems design of memory, process management and its relevant Unix concepts
Pre-requisite	-
Course Out come	Get the basic knowledge of operating system concepts, Unix structure and file system commands
Course Content	**1. Operating System Concepts** 1.1. Evolution of OS, Need of an Operating System, Types of OS 1.2. Booting process 1.3. Functions of OS 1.4. Interrupt and System call, Data bus and Address bus **2. I/O Device and File Management** 2.1 I/O Devices, Device controllers and drivers, DMA, Programmed I/O, Interrupt driven I/O, I/O using DMA 2.2 Disk space Management 2.3 Allocation and Disk Arm Scheduling Methods (FCFS, SSTF, SCAN, C-SCAN) 2.4 File - Structure, Attributes, Types, Access, Operations, Protection, Directory - Structures and operations. 2.5 File system management and optimization - Disk space management, backup, consistency, Performance, Defragmentation **3 Memory Management** 3.1 Address space, Contiguous and non contiguous allocation, Managing free space (Garbage collection) 3.2 Virtual memory - Paging, Page size, Page table, Page fault, Demand Paging, Page replacement algorithms (FIFO, LRU, 2nd Chance NRU Optimal) , Shared page 3.3 Segmentation - Implementation of pure segmentation, segmentation with paging. **4. Process Management** 4.1 Process, Process states, PCB, Process scheduling 4.2 Scheduling Algorithms(Round-robin, FCFS, SJF, SRTF, Priority) 4.3 Overview of Inter process communication 4.4s Deadlocks - Overview of Deadlock Avoidance, Prevention and Recovery.
Reference Books	1. Operating System Concepts, James Peterson McGrawHill 2. An OS Concept ,Silberschatz AdditionWesley Publication

	3. An Operating Systems, W.Stallings Pearson Education 4. Understanding Operating Systems, I.M.Flinn, A.M. Mchoes – Thomson Learning 5. Operating Systems, Donovan M McGrawHill Publication 6. Operating Systems: A Design Oriented Approach, Crowley TataMcGrawHill Publication 7. Operating Systems, S. Godbole TMH. 8. OperatingSystems: Designand Implementation, Tanenbaum & Woodhull 9. The Design of the Unix Operating System, Maurice J. Bach PHI

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 607-1 : Software Quality Assurance

Course Code	**607-1 GENERIC ELECTIVE (IDS)**
Course Title	**Software Quality Assurance**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	This course imparts the knowledge of software Quality its factors & Models along with it gives knowledge of Reviews & Audits and Statistical Quality Assurance and Metrics
Course Objective	To have awareness of software Quality its factors & Models along with it awareness about Reviews & Audits and Statistical Quality Assurance ,Quality Assurance Standards and Metrics
Pre-requisite	Basic Idea of Software Engineering & Software Development Life Cycle.
Course Out come	Student should have awareness of what software Quality assurance is and its factors & Models along with students should have awareness about Reviews & Audits and Statistical Quality Assurance ,Quality Assurance Standards and Metrics etc.
Course Content	**1 Introduction to Software Quality & Quality Assurance** 1.1 Definition of Quality & Software Quality 1.2 Quality Factors & Models 1.3 Quality Control & Assurance **2 Software Quality Assurance** 2.1 SQA & its Activities 2.2 Software Reviews & Audits 2.2.1 Defect identification & removal 2.2.2 Formal technical reviews—Guidelines for meeting & record keeping 2.2.3 Requirement Reviews 2.2.4 Design Reviews 2.2.5 Code Reviews **3 Introduction to Statistical Quality Assurance** 3.1 Quality Assurance Standards 3.2 Overview: ISO 9000 , 9001:2000 and 9001:2008,CMM & CMMi. **4 Technical Metrics for Quality Measurement** 4.1 Metrics & Measurements and Measurement Principals 4.2 Attributes of Effective Software Metrics 4.3 Overview of Project, Product & process related metrics 4.4 Metrics for Analysis model

	4.4.1 Function based metrics 4.4.2 Bang metrics 4.5 Metrics for design model 4.5.1 High level Design Metrics 4.5.2 Component Level Design Metrics 4.6 Metrics for Source Code, Testing & Maintenance 4.7 Software Reliability & its Measurement
Reference Books:	1. Software Engineering: A Practitioner's Approach, 4e/5e, Roger S. Pressmann , McGrawHill Publication. 2. Software Quality for Producing Practical and Consistent Software , Mordechai Ben-Monachem, Gray S. Marliss , Thomson Learning 3. Software Quality Assurance , Milind Limaye , McGraw Hill. 4. CMM in Practice , Pankaj Jalote , Pearson Education 5. ISO 9001:2000 for software organizations, Swapna Kishor, Rajesh Naik, Tata McGrawHill. 6. Software Engineering , K. K. Aggrawal, Yogesh Singh , New Age International Publishers. 7. Fundamentals of Software Engineering , carlo Ghezzi, Mehdi Jazayeri, Dino Mendrilo , PHI 8. Software Engineering , Ian Summwerville, Addison Wesley , Pearson Education 9. Software Engineering , K. L. James , PHI

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
T Y B. Sc. (Computer Science)
Syllabus for T. Y. B. Sc. Semester-VI
Effective From: June-2019

Course: 607-2 : ORGANIZATION STRUCTURE & BEHAVIOUR

Course Code	**607-2 GENERIC ELECTIVE (IDS)**
Course Title	**ORGANIZATION STRUCTURE & BEHAVIOUR**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	To make students aware about the Structure of an Organization and also provide them teaching that leads to better understanding of human behaviour in an organization.
Course Objective	To Give idea of Organization and its Structure and need of Management in organization and factors like Attitude , Motivation & leadership
Pre-requisite	Basic Communication Skills
Course Out come	After completion of this course student will be about the Structure of an Organization and get idea that leads to better understanding of human behaviour in an organization along with it students will have idea about BPO and call centers.
Course Content	**1. Introduction to Organization** 1.1. What makes an organization 1.2. Structure of organization 1.3. What is Management 1.4. Scope of Management **2. Need for Management** 2.1. Role of Management 2.2. Manager's Role (Interpersonal Role, Information Role and Decisional Role) 2.3. Managerial Skills (Technical Skills, Human Skills, Conceptual Skills) **3. Attitude , Motivation & Leadership** 3.1. Meaning of Attitudes 3.2. Characteristics of Attitudes 3.3. What is motivation? 3.4. Nature and Characteristics of Motivation 3.5. Importance & Benefits of Motivation 3.6. What is Leadership? 3.7. Characteristics of Leadership 3.8. Leadership Styles 3.9. Leadership Skills (Technical Skills, Human Skills, Conceptual Skills. Personal Skills) **4. BPO & Call Center** 4.1. What is B.P.O? 4.2. What is out-sourcing? Benefits of outsourcing

	4.3. What is Call Center? 4.4. Call center setup & functions
Reference Books:	1. Management & Organization Development , Ahmed Abod Rachna Prakashan, New Delhi 2. Organization Behaviour , Aplewhite Philip , Prentice hall 3. Management & Organization Development , Argyris Chris , McGraw Hill 4. Human Behaviour at work , Davis Keeth , Tata McGraw Hill 5. Organization Behaviour , L.M. Prasad

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT

T Y B. Sc. (Computer Science)

Syllabus for T. Y. B. Sc. Semester-VI

Effective From: June-2019

Course: 607-3 INFORMATION SYSTEMS

Course Code	**607-3 GENERIC ELECTIVE (IDS)**
Course Title	**INFORMATION SYSTEMS**
Credit	2
Teaching per Week	3 Hrs
Minimum weeks per Semester	15 (Including Class work, examination, preparation, holidays etc.)
Last Review / Revision	June, 2019
Purpose of Course	Make students aware and understand various types of Information Systems.
Course Objective	1. Learn the different types of Information Systems. 2. To emphasize on the application of information to business management.
Pre-requisite	NIL
Course Out come	After completion of the course the students will understand and appreciate the basic concepts of Information System, importance of MIS for an organization and understand Transaction processing systems and its types.
Course Content	**1. Introduction** 1.1. Data & Information 1.2. Information need and benefits 1.3. Input, Processing , Output and feedback **2. Concepts of Systems** 2.1. Definition of system in an organization 2.2. Types of systems. 2.3 Business as an information system **3. Introduction to various Information Systems** 3.1. Business information Systems 3.1.1. ERP 3.2. Management Information Systems 3.2.1. Characteristics of MIS 3.2.2. Development process of MIS 3.3. Decision support systems and GDSS. **4. Transaction Processing Systems** 4.1. Overview of Transaction Processing System 4.2. Transaction Processing methods & objectives 4.3. Transaction Processing Activities 4.4. Traditional transaction processing Applications 4.4.1. Order Processing Systems 4.4.2. Purchase Systems 4.4.3. Accounting Systems
Reference Books:	1. Principles of information system , Ralf M. Stair & George W.Reynolds , Thomson LearningPublisher 2. Management information Systems– Text & Applications , CVS Murthy , HPH 3. Management information Systems Organization and technology – Forth Edition , K.C.Laudan & J.P. Laudan , Prentice Hall India 4. Management information system , W.S.Jawadekar , Tata McGraw Hill