VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2013
Semester: 5 Paper 501

Paper Title: Software Engineering -1

1 Introduction to Software Engineering
- **1.1** Software
  - **1.1.1** Software & Software Types
  - **1.1.2** software characteristics & problems
  - **1.1.3** Introduction to Software quality
- **1.2** Software Engineering & problem related to it
- **1.3** Software engineering approach
  - **1.3.1** Introduction to phased development approach
  - **1.3.2** Project management activities
  - **1.3.3** Introduction to effort distribution

2 Software Development Processes
- **2.1** Relationship between Processes, Projects and Products
- **2.2** Software process models
  - **2.2.1** Linear sequential/ waterfall model
  - **2.2.2** Prototype model
  - **2.2.3** RAD model
  - **2.2.4** Incremental model
  - **2.1.5** Spiral model

3 Software Requirement analysis & specification
- **3.1** Introduction to requirement analysis & specification
  - **3.1.1** Need for analysis
  - **3.1.2** Activities, roles & responsibilities
- **3.2** Software requirements- Characteristics & issues
- **3.3** Requirement gathering formal & informal techniques
  - **3.3.1** Interviews
  - **3.3.2** Questionnaires
  - **3.3.3** System walk through
  - **3.3.4** Document survey
  - **3.3.5** Introduction to FAST , QFD & JAD
- **3.4** Requirement modeling
  - **3.4.1** Elements of analysis models
  - **3.4.2** Structured modeling – data modeling, functional modeling, functional modeling ,structure behavior , data, attribute, relationship, cardinality &ERD
  - **3.4.3** Functional modeling – DFD & process specification
  - **3.4.4** Introduction to behavioral modeling
  - **3.4.5** Data Dictionary
- **3.5** Software Requirement Specification
  - **3.5.1** Structure & Component of SRS
  - **3.5.2** Characteristics of SRS
- **3.6** Introduction to Requirement validation
- **3.7** Case Study

4 Software Designing
- **4.1** Introduction to Design
  - **4.1.1** Importance of design
  - **4.1.2** Relationship between analysis & design
  - **4.1.3** Design Principals
- **4.2** Design Concepts

4.2.1 System level design concepts – Abstraction, Refinement , Modularity, Structural Partitioning & Structured Charts
4.2.2 Module level design concepts – Coupling , Cohesion

4.3 Detailed Design
4.3.1 Data design guidelines
4.3.2 Overview of Designing software architecture
4.3.3 Interface design guidelines
4.3.4 Procedural design techniques

References:

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
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2013
Semester: 5 Paper 502

Paper Title: Computer Networking - 1

1. Network Fundamentals:

1.1 Introduction to Networks, Network topologies and types of networks.
1.1.1 What is networking?
1.1.2 Exchange, sharing, preserving and protecting information, sharing hardware and software resources, Need, Uses and advantages of Network.
1.1.3 Network in work places(Tools and Task)
1.1.4 Network topologies (Bus, Star, Ring, StarBus, Star Ring, Mesh)
1.1.5 Client/Serve , hybrid and Peer-Peer network.
1.1.6 Transmission media (H/W Protocols, S/w Protocols, H/W and S/W interfaces)

2 OSI Model

2.1 Introduction to OSI Model
2.2 OSI Model Lower layer function (Physical and Data Link Layers), OSI Model Middle Layer Function (network and transport Layers), OSI Model Upper Layer Function (Session, Presentation and Application Layers).
2.3 Upper Layer Devices

3. Network hardware and Software

3.1 Network Cards and Cables, Repeaters, Hubs, Routers and Bridges.
3.1.1 Network cards, repeaters – its use and selection criteria.
3.1.2 Splitting up networks
3.1.3. Bridges – Use and working of bridges
3.1.4. Switches - Use and working of switches
3.1.5 Routers – Use and working of Routers.

3.2 Network Operating Systems
3.2.1 Peer Network operating system (windows-XP) – Networking features of Window-XP.
3.2.2 Client-Server Operating System – Their common features.

4. Network Security Issues, concept and terminology

4.1 Definition of various types of security.
4.2 Security problems and possible problems (Theft, Unauthorized Disclosure,Information warfare, Accidental Data Loss)

References:

1	Networking Complete – 3rd Edition	-	BPB Publication
2	Mastering Local Area Networks	Christa Anderson & Mark Minasi	BPB Publication
3	Networking Essentials Study Guide	MCSE	Tata McGraw Hill Publication
4	Windows 2000 N/W Infrastructure Desing	MCSE	Tata McGraw Hill Publication
5	Windows 2000 Professional Study Guide	MCSA/MCSE	Tata McGraw Hill Publication
6	Computer Networks	TenanBaum	PHI
7	Data communication & N/W	B. Forouzan	Tata McGraw Hill Publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2013
Semester: 5 Paper 503

Paper Title: Computer Graphics

1.Overview of Computer Graphics
- 1.1 Historical background of computer Graphics
- 1.2 Applications of Computer Graphics
- 1.3 Popular graphics software
- 1.4 Pixel graphics versus Vector Graphics
- 1.5 Hard copy graphics Devices

2. Graphics primitive
- 2.1 Line Drawing Algorithms
  - 2.1.1 Vecgen Algorithm
  - 2.1.2 Brasenham Line Drawing Algorithm
- 2.2 Circle generating algorithms
  - 2.2.1 Parametric circle drawing algorithm
  - 2.2.2 Brasenham circle algorithm
- 2.3 Different line styles
  - 2.3.1 Thick line
    - 2.3.2 Line caps
    - 2.3.3 Thick line joins
    - 2.3.4 Pens and Brushes
- 2.4 Curves
  - 2.4.1 DDA approach for drawing a circular arc
- 2.5 Text and Character Attributes
- 2.6 Anti Aliasing

3. Polygons
- 3.1 Polygon formation
- 3.2 Polygon inside tests
  - 3.2.1 Even – odd method
  - 3.2.2 Winding number method
  - 3.2.3 Some other method for performing inside test
- 3.3 Polygon area filling
  - 3.3.1 Flood fill method
  - 3.3.2 Scan line fill method
  - 3.3.3 Boundry fill

4. Geoetric Transformation
- 4.1 Basic transformation
  - 4.1.1 Scalling, Translation, Rotation
- 4.2 Homogeneous Coordinates
- 4.3 Rotation relative to and Arbitary point
- 4.4 Some other transformations: Reflextion, Sharing
- 4.5 Coordinate Transformation
- 4.6 Inverse Transformation
- 4.7 Affine Transformation
- 4.8 Rastar Transformation

5. Viewing in two dimensions
- 5.1 Window and View port
- 5.2 Viewing Transformation
- 5.3 Clipping
  - 5.3.1 Point Clipping
  - 5.3.2 Line Clipping
  - 5.3.3 Polygon Cliping
- 5.4 Sutherland – Hodgman Polygon clipping algorithm

5.5 Text Clipping
5.6 Multiple windowing

6. Color and Shading: Light Sources, Illumination, Shading, Transperancy, Shadow, Colors

7. Graphics File formats: Bitmap, JPEG, GIF

References:

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	Computer Graphics : Algorithms & Implementations	Mukherjee & Jana	PHI
7	Interactive Computer Graphics	Giloi W.K.	Prentice Hall India
8	Principles of Interactive Computer Graphics	New Man W. & Sproul P.F.	McGraw Hill
9	Procedural Elements for Computer Graphics	Rogers D.F.	McGraw Hill

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2013
Semester: 5 Paper 504

Paper Title: Java Programming -1

1. **Introduction to Java**
   - 1.1 History of java
   - 1.2 Versions of Java
   - 1.3 Different programming environments for Java
   - 1.4 Java Documentation
2. **Fundamentals of Java**
   - 2.1 Java keywords and symbols
   - 2.2 Constants and Identifiers
   - 2.3 Data types in Java
   - 2.4 Comments in java
   - 2.5 Java Operators
   - 2.6 Conditional statements
   - 2.7 Control Structures in Java
3. **Class Structures in Java**
   - 3.1 class structure in Java
   - 3.2 Inheritance
   - 3.3 Polymorphism
   - 3.4 this and super
   - 3.5 Data Hiding and Encapsulation
   - 3.6 memory management in Java
   - 3.7 Garbage collection
4. **Java Packages**
   - 4.1 Concepts of Package
   - 4.2 Defining package
   - 4.3 Importing class and package
5. **Interfaces**
   - 5.1 Concepts of Interface
   - 5.2 Defining Interface
   - 5.3 Implementing Interface
   - 5.4 Implementing multiple interfaces
   - 5.5 Extending Interface
   - 5.6 Concepts of Abstract class
   - 5.7 Difference between Interface and Abstract class
6. **Arrays in java**
   - 6.1Creating, initializing and Accessing Arrays
   - 6.2 Array operations
   - 6.3 2-D arrays
   - 6.4 Multidimensional Arrays
7. **String and StringBuffer Class**
   - 7.1 Creating String
   - 7.2 Length of String
   - 7.3 Concatenating Strings
   - 7.4 Creating Formatted Strings
   - 7.5 String Methods
   - 7.6 String buffer class Constructors of StringBuffer, Built-in functions of StringBuffer
   - 7.7 Performance comparison of String and StringBuffer

References:

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
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2013
Semester: 5 Paper - 505

Paper Title: Fundamentals of Php

1. Introduction to PHP
- 1.1 Installation of PHP
- 1.2 PHP configuration in IIS & Apache Web Server and features of PHP
- 1.3 Understanding WAMP

2. Writing PHP
- 2.1. How PHP code is parsed
- 2.2. Embedding PHP and HTML
- 2.3. Executing PHP and viewing in Browser
- 2.4. Data types
- 2.5. Operators
- 2.6. PHP variables: static and global variables
- 2.7. Comments in PHP

3. Control Structures
- 3.1. Condition statements
  - 3.1.1. If…Else
  - 3.1.2. Switch
  - 3.1.3. ? Operator
- 3.2. Loops
  - 3.2.1. While
  - 3.2.2. Break Statement
  - 3.2.3. Continue
  - 3.2.4. Do…While
  - 3.2.5. For
  - 3.2.6. For each
- 3.3. Exit, Die, Return
- 3.4. Arrays in PHP

4. Working with Data
- 4.1. FORM element, INPUT elements
- 4.2. Validating the user input
- 4.3. Passing variables between pages
  - 4.3.1. Passing variables through a GET
  - 4.3.2. Passing variables through a POST
  - 4.3.3. Passing variables through a REQUEST

5. PHP with Oops (object oriented programming)
- 5.1 Object oriented concepts
  - 5.1.1 Understanding Object
  - 5.1.2 Define a class
  - 5.1.3 Class attributes
- 5.2 Creating an object
- 5.3 Object constructors & destructors
- 5.4 Class constants
- 5.5 Static method
- 5.6 Class inheritance
- 5.7 Abstract classes
- 5.8 Final keyword
- 5.9 Implementing Interface
- 5.10 Object serialization

References:

1	The complete Reference PHY	Stever Holzner	McGrow Hill
2	PHP 5.0 and MySql Bible Tim Converse	Joyce Park, Clark Morgan	John Wiley & Sons
3	MySql Bible	Steve Suehring	John Wiley & Sons
4	PHP Black Book	Peter Moulding	O'Relly Publication
5	Beginning PHP 5.3	Matt Doyle	Wrox Publication

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus for T. Y. B. Sc (Computer Science)
With effect from June 2013
Semester: 5 Paper 11

Paper Title: Operating System-1

1. Operating System Concepts

- 1.1. Evolution of Operating System & History
- 1.2. Need of an Operating System
- 1.3. Single User & Multi User Operating System
- 1.4. Elements of an Operating System
- 1.5. Operating System as a Resource Manager

2. Memory Management

- 1.1. Memory Management Functions
- 1.2. Contiguous Allocation
  - 1.2.1. Partitioned Memory Static and Dynamic allocation
  - 1.2.2. Segmentation
- 1.3. Non-contiguous Allocation
  - 1.3.1. Paging Segmentation
  - 1.3.2. Demand Paging and Segmentation
  - 1.3.3. Allocation and Replacement Policies

3. Process Management

- 2.1. Process Management
- 2.2. Process Concept
- 2.3. Scheduling
- 2.4. Scheduling Algorithms
- 2.5. Process co-ordination
  - 2.5.1. Producer / consumer Problem
  - 2.5.2. Critical Section Problem
  - 2.5.3. Semaphores
  - 2.5.4. Inter Process Communication
  - 2.5.5. Deadlocks

References:

1	Operating System Concepts	James Peterson	McGraw Hill
2	An OS Concept	Silberschatz	Addition Wesley 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	McGraw Hill Publication
6	Operating Systems : A Design Oriented Approach	Crowley	Tata McGraw Hill Publication
7	Operating Systems	S. Godbole	TMH.
8	Operating Systems : Design and Implementation, 3rd Edition	Tanenbaum & Woodhull	-

STUDENTS ARE SUPPOSED TO SELECT ONE PAPER FROM THE GENERUIC ELECTIVE SUBJECTS

VEER NARMAD SOUTH GUJARAT UNIVERSITY – SURAT
Syllabus as per CBCS
T.Y.B.Sc.(Computer Sci.) Semester – 5
Effective From: June-2013
GENERIC ELECTIVE (IDS) – 507-1

Subject: Open Source Tools

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

References:

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
Syllabus as per CBCS
T.Y.B.Sc.(Computer Sci.) Semester – 5
Effective From: June-2013
GENERIC ELECTIVE (IDS) 507-2

Subject: OPERATION RESEARCH

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 and Assignment 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.
2.5 Assignment problem,
2.6 The Hungarian method, Balanced & Unbalanced Assignment Problem.

3: Game Theory:

3.1 Competitive Problem,
3.2 Two-persion zero –sum game,
3.3 Maximin and Minimax Principle,
3.4 Saddle point and the Value of the game(based on pure Strategies),
3.5 Mixed strategies ,
3.6 Solution of games with saddle point ,
3.7 Dominance rule

References:

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
Syllabus as per CBCS
T.Y.B.Sc.(Computer Sci.) Semester – 5
Effective From: June-2013
GENERIC ELECTIVE (IDS) 507-3

Subject: System Software

1 Introduction to system software
- **1.1** System Software & its characteristics
- **1.2** Overview of System Software Categories

2. Language Processor
- **2.1** Introduction to Language Processing
- **2.2** Language Processing Activities
  - **2.2.1** Program Generation
  - **2.2.2** Program Execution-Translation & Interpretation
- **2.3** Passes and Phases of Language Processor
  - **2.3.1** Intermediate Representation of Program
  - **2.3.2** Lexical Analysis-scanning
  - **2.3.3** Syntax Analysis-parsing
  - **2.3.4** Semantic analysis
  - **2.4.5** Memory Allocation
  - **2.4.6** Code Generation
- **2.4** Fundamentals of Language Specification
  - **2.4.1** Programming Language Grammar, its classification, ambiguity in Grammatical Specification & its elimination
  - **2.4.2** Binding and Binding Times

3 Assemblers
- **3.1** Instruction formats, Addressing Modes and program Relocation
- **3.2** Literals, symbols, expressions, program blocks, control section and program linking
- **3.3** Design of a One pass /Single pass assembler

4. Compilers and Interpreters
- **4.1** Introduction to datatypes, data structures, scope rules and control structures
- **4.2** Basic Compiler Functions-Grammars, Lexical Analysis, Syntactic Analysis and Code Generation
- **4.3** Introduction to memory allocation
- **4.4** Compilation of expressions
- **4.5** Compilation of Control structures
- **4.6** Code Optimization
- **4.7** Interpreters, P-code Compilers & Compiler –compilers

5 Loaders & Linkers

- **5.1** Basic Loader Functions
- **5.2** Relocation and Linking Concepts
- **5.3** Design of a loader / linker

References:

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

Semester V course Structure:

SR No	Course	Papers Code	Paper Title	Theory Credit	Theory Hours	Practical Credit	Practical Hours	Total credits	Total Hours
1.	Core Compulsary Computer	501 502 503 504 505 506	Software Engineering-I Computer Networking-I Computer Graphics Java Programming-I Fundamentals of Php Operating System-1 Minor Project	2 2 2 2 2 2	2 2 2 2 2 2	0 0 1 1 1 0 3	0 0 2 2 2 0 6	18	24
2.	Generic Elective	507-1 507-2 507-3	Open Source Tools Operation Research System Software	2	3	NIL		02	03
3	Foundation Compulsory			2	3	0		02	03
4	Foundation Elective			2	2			02	02
Total				18	20	6	12	24	32

SR No	Course	Papers Code	Paper Title	Theory(Marks) Internal	Theory(Marks) Ext.	Practical(Marks) Inernal	Practical(Marks) Ext.	Total Credits
1.	Core Compulsory Computer	501 502 503 504 505 506	Software Engineering-I Computer Networking-I Computer Graphics Java Programming-I Fundamentals of Php Operating System-1 Minor Project	20 20 20 20 20 20	50 50 50 50 50 50	0 0 10 10 10 0 30	0 0 20 20 20 0 60	18
2.	Generic Elective	507-1 507-2 507-3	Open Source Tools Operation Research System Software	30	70	NIL		02
3	Foundation Compulsory			30	70	0		02
4	Foundation Elective							

Note: Students are supposed to do a project which is equivalent to 3 practical(6 hrs)
Practical Batch size : 15 students in a batch