GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) AND INFORMATION TECHNOLOGY (16)
SOFTWARE ENGINEERING
SUBJECT CODE: 2160701
B.E. 6th SEMESTER

Type of course: NA

Prerequisite: Object Oriented Programming fundamental, UML

Rationale:

- To study pioneer of Software Development Life Cycle, Development models and Agile Software development.
- To study fundamental concepts in software testing, including software testing objectives, process, criteria, strategies, and methods.
- To discuss various software testing issues and solutions in software unit test; integration, regression, and system testing.
- To learn the process of improve the quality of software work products.
- To gain the techniques and skills on how to use modern software testing tools to support software testing projects.
- To expose Software Process Improvement and Reengineering

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction to Software and Software Engineering** The Evolving Role of Software, Software: A Crisis on the Horizon and Software Myths, Software Engineering: A Layered Technology, Software Process Models, The Linear Sequential Model, The Prototyping Model, The RAD Model, Evolutionary Process Models, Agile Process Model, Component-Based Development, Process, Product and Process.	06 hours	15%
2.	**Agile Development** Agility and Agile Process model, Extreme Programming, Other process models of Agile Development and Tools.	02 hours	5%

3	**Managing Software Project** Software Metrics (Process, Product and Project Metrics), Software Project Estimations, Software Project Planning (MS Project Tool), Project Scheduling & Tracking, Risk Analysis &Management (Risk Identification, Risk Projection, Risk Refinement , Risk Mitigation).	04 hours	10%
4	**Requirement Analysis and Specification** Understanding the Requirement, Requirement Modeling, Requirement Specification (SRS), Requirement Analysis and Requirement Elicitation, Requirement Engineering.	03 hours	10%
5	**Software Design** Design Concepts and Design Principal, Architectural Design, Component Level Design (Function Oriented Design, Object Oriented Design) (MS Visio Tool),User Interface Design, Web Application Design.	04 hours	10%
6.	**Software Coding & Testing** Coding Standard and coding Guidelines, Code Review, Software Documentation, Testing Strategies, Testing Techniques and Test Case, Test Suites Design, Testing Conventional Applications, Testing Object Oriented Applications, Testing Web and Mobile Applications, Testing Tools (Win runner, Load runner).	05 hours	15%
7	**Quality Assurance and Management** Quality Concepts and Software Quality Assurance, Software Reviews (Formal Technical Reviews), Software Reliability, The Quality Standards: ISO 9000, CMM, Six Sigma for SE, SQA Plan.	04 hours	10%
8	**Software Maintenance and Configuration Management** Types of Software Maintenance, Re-Engineering, Reverse Engineering, Forward Engineering, The SCM Process, Identification of Objects in the Software Configuration, Version Control and Change Control	03 hours	10%
9.	**Software Engineering and Software as a Service** Product Lifetime: Independent Product Vs. Continues, Improvement, Software as a Service, SaaS Architecture.	02 hours	5%
10	**Advanced Topics in Software Engineering** Component-Based Software Engineering, Client/Server Software Engineering, Web Engineering, Reengineering, Computer-Aided Software Engineering, Software Process Improvement, Emerging Trends in software Engineering.	03 hours	10%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**20**	**10**	**10**	**5**	**5**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Roger S.Pressman, Software engineering- A practitioner's Approach, McGraw-Hill International Editions
2. Ian Sommerville, Software engineering, Pearson education Asia
3. Pankaj Jalote, Software Engineering – A Precise Approach Wiley
4. Software Engineering Fundamentals by Ali Behhforoz & Frederick Hudson OXFORD
5. Rajib Mall, Fundamentals of software Engineering, Prentice Hall of India.
6. Engineering Software as a Service An Agile Software Approach, Armando Fox and David Patterson
7. John M Nicolas, Project Management for Business, Engineering and Technology, Elsevier

Course Outcome:

After learning the course the students should be able to:

1. Prepare SRS (Software Requirement Specification) document and SPMP (Software Project Management Plan) document.
2. Apply the concept of Functional Oriented and Object Oriented Approach for Software Design.
3. Recognize how to ensure the quality of software product, different quality standards and software review techniques.
4. Apply various testing techniques and test plan in.
5. Able to understand modern Agile Development and Service Oriented Architecture Concept of Industry.

List of Experiments:

(Pl. Note: List of Experiments and Tutorials should be as per theory covered in the class, below mentioned practical are just for the reference purpose)

Tutorial-1

Study the complete Software Development Life Cycle (SDLC) and analyze various activities conducted as a part of various phases. For each SDLC phase, **identify** the objectives and **summaries** outcomes.

Tutorial-2

Consider any project to be developed in any technology as a Software Architect or Project Manager. **Construct** Software Requirement Specification (SRS) document for the project.

Tutorial-3

Considering your immense expertise in software development, The Absolute Beginners Inc. has recently allotted you a mega project. The goal of the project is to create a database of all Hindi films released since 2000. The software would allow one to generate a list of top ten hit films, top ten flop films, best comedy films, and so on. Using your prior experience you have decided the approximate sizes of each module of the software as follow:

- Data entry (0.9 KDSI)
- Data update (0.7 KDSI)
- Query (0.9 KDSI)
- Report generation and display (2 KDSI)

Also take into consideration the following cost drivers with their ratings:

- Storage constraints (Low)
- Experience in developing similar software (High)
- Programming capabilities of the developers (High)
- Application of software engineering methods (High)
- Use of software tools (High)

(All other cost drivers have nominal rating).

Now answer the following:

- **Solve** the problem by **Applying** Basic and intermediate COCOMO
    - Find Project Type?
    - Find Project Size?
    - Find Initial Effort Estimation?
    - Find Adjusted Effort Estimation?
    - Find schedule?
    - Find minimum size of the team you would require to develop this system?
- Assuming that your client would pay Rs. 50,000 per month of development, how much would be the likely billing?

Tutorial-4:

Function Point: http://conferences.embarcadero.com/article/32094#Bonus .

Analyze the case study and **identify** the error and **solve** it. At the end, need to **assess** calculation part of effort using FP oriented estimation model.

Tutorial-5

Consider the following Java code segment:

```
public Hashtable countAlphabet(String aString){
   Hashtable table = new Hashtable();
   If (aString.length > 4000) return table;
   StringBuffer buffer = new StringBuffer(aString);
   While (buffer.length() > 0){
         String firstChar = buffer.substring(0, 1);
         Integer count = (Integer)table.get(firstChar);
         if (count == null){
               count = new Integer(1);
         } else{
               count = new Integer(count.intValue() + 1);
         }
         table.put(firstChar, count);
         buffer.delete(0, 1);
   }
   return table;
}
```

1. Guarantees that all independent execution path is exercised at least once;
2. Guarantees that both the true and false side of all logical decisions are exercised;
3. Executes the loop at the boundary values and within the boundaries.

Sketch out Design control flow diagram and **Apply** Cyclomatic complexity for given Code. **Identify** numbers of Independence path require for testing.

Tutorial 6:-

Subject Project: For below mentioned Systems and other systems assign a mini-project two a group of students to prepare Software documents mentioned as A to E

1. Library Information System
2. Villager Telephone System
3. Waste Management Inspection Tracking System (WMITS)
4. Flight Control System
5. Ambulance Dispatching System

A. Development of Software Requirements Specification (SRS)
B. Function oriented design using SA/SD
C. Object-oriented design using UML
D. Test case design
E. Implementation using Java and testing

Design based Problems (DP)/Open Ended Problem:

- Assume that you are Software Architect or Project Manager in organization. You have been assigned the task of constructing a website for a specific company with your team. Design and priorities the test cases using test case templates for this project.

- For Natural Language Processing (NLP) applications, estimate project failure rate.

- Design and develop an open source method of detecting the DIFFERENCESS between two engineering designs for the same problem.

List of Open Source Software/learning website:

- www.en.wikipedia.org/wiki/Software_engineering
- www.win.tue.nl
- www.rspa.com/spi
- www.onesmartclick.com/engsineering/software-engineering.html
- www.sei.cmu.edus
- https://www.edx.org/school/uc-berkeleyx

Various Web Based SE Tools

- Software:-Rational Rose, Microsoft Visio, Enterprise resource planning
- Project Management Tools
- SCM Tools
- SQA Tools
- Analysis and Design Tools
- User Interface Development Tools
- Object-Oriented Software Engineering Tools
- Testing Tools

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07)
ADVANCED JAVA
SUBJECT CODE: 2160707
B.E. 6th SEMESTER

Type of course: Core

Prerequisite: NA

Rationale: NA

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	Java Networking Network Basics and Socket overview, TCP/IP client sockets, URL, TCP/IP server sockets, Datagrams, java.net package Socket, ServerSocket, InetAddress, URL, URLConnection	**06 Hrs**	5
2	JDBC Programming The JDBC Connectivity Model, Database Programming: Connecting to the Database, Creating a SQL Query, Getting the Results, Updating Database Data, Error Checking and the SQLException Class, The SQLWarning Class, The Statement Interface, PreparedStatement, CallableStatement The ResultSet Interface, Updatable Result Sets, JDBC Types, Executing SQL Queries, ResultSetMetaData, Executing SQL Updates, Transaction Management.	**08Hrs**	10
3	Servlet API and Overview Servlet Model: Overview of Servlet, Servlet Life Cycle, HTTP Methods Structure and Deployment descriptor ServletContext and ServletConfig interface, Attributes in Servelt, Request Dispacher interface The Filter API: Filter, FilterChain, Filter Config Cookies and Session Management: Understanding state and session, Understanding Session Timeout and Session Tracking, URL Rewriting	**10 Hrs**	25
4	Java Server Pages JSP Overview: The Problem with Servlets, Life Cycle of JSP Page, JSP Processing, JSP Application Design with MVC, Setting Up the JSP Environment	**10 hrs**	25

	JSP Directives, JSP Action, JSP Implicit Objects JSP Form Processing, JSP Session and Cookies Handling, JSP Session Tracking JSP Database Access, JSP Standard Tag Libraries, JSP Custom Tag, JSP Expression Language, JSP Exception Handling, JSP XML Processing.		
5	Java Server Faces2.0 Introduction to JSF, JSF request processing Life cycle, JSF Expression Language, JSF Standard Component, JSF Facelets Tag, JSF Convertor Tag, JSF Validation Tag, JSF Event Handling and Database Access, JSF Libraries: PrimeFaces	**04 Hours**	10
6	Hibernate 4.0 Overview of Hibernate, Hibernate Architecture, Hibernate Mapping Types, Hibernate O/R Mapping, Hibernate Annotation, Hibernate Query Language	**8 Hrs**	15
7	Java Web Frameworks: Spring MVC Overview of Spring, Spring Architecture, bean life cycle, XML Configuration on Spring, Aspect – oriented Spring, Managing Database, Managing Transaction	**08 Hrs**	10

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
10	**30**	**30**	**-**	**-**	**-**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Black Book " Java server programming" J2EE, 1st ed., Dream Tech Publishers, 2008. 3. Kathy walrath "
2. Complete Reference J2EE by James Keogh mcgraw publication
3. Professional Java Server Programming by Subrahmanyam Allamaraju, Cedric Buest Wiley Publication
4. SCWCD, Matthew Scarpino, Hanumant Deshmukh, Jignesh Malavie, Manning publication
5. Core Java, Volume II: Advanced Features by Cay Horstmann and Gary Cornell Pearson Publication
6. Java Persistence with Hibernate by Christian Bauer, Gavin King
7. Spring in Action 3rd edition , Craig walls, Manning Publication
8. Hibernate 2nd edition, Jeff Linwood and Dave Minter, Beginning Après publication
9. Java Server Faces in Action, Kito D. Mann, Manning Publication
10. JDBC™ API Tutorial and Reference, Third Edition, Maydene Fisher, Jon Ellis, Jonathan Bruce, Addison Wesley
11. Beginning JSP, JSF andTomcat, Giulio Zambon, Apress
12. JSF2.0 CookBook, Anghel Leonard, PACKT publication

Course Outcome:

Upon completion of this course, students will be able to do the following:

1. Use various tools, and Validation techniques, use of different templates available in IntelliJ IDEA, Implementation and testing strategies in real time applications.
2. Use advanced concepts related to Web Services, spring and Hibernate.

List of Experiments:

Socket Programming(TCP/UPD)

1) Create chat application using either TCP or UDP protocol.
2) Implement TCP Server for transferring files using Socket and ServerSocket
3) Implement any one sorting algorithm using TCP/UDP on Server application and Give Input On Client side and client should sorted output from server and display sorted on input side.
4) Implement Concurrent TCP Server programming in which more than one client can connect and communicate with Server for sending the string and server returns the reverse of string to each of client
5) Write RMI application where client supplies two numbers and server response by summing it. Provide your custom security policy for this application.
6) Implement Student information system using JDBC and RMI.

JDBC/Servlet

7) Create Servlet file which contains following functions:
    1. Connect 2. Create Database 3. Create Table 4. Insert Records into respective table 5. Update records of particular table of database 6. Delete Records from table. 7. Delete table and also database.
8) User can create a new database and also create new table under that database. Once database has been created then user can perform database operation by calling above functions. Use following Java Statement interface to implement program:
    1. Statement 2. Prepared statement 3. Callable statement
9) Create Servlet file and study web descriptor file.
10) Create login form and perform state management using Cookies, HttpSession and URL Rewriting.
11) Implement Authentication filter using filter API.
12) Create database of student subject-wise data and retrieve all data using JSP and generate xml structure along with DTD and XML Schema definition
13) Refer Practical 11 and apply XSLT (Style) to generated xml document and print your result.
14) Create web service which provides student information.
15) Create Web Service client which consume above service and display student data by entering student id.
16) Study and implement Hibernate
17) Study and Implement MVC using Spring Framework

Design based Problems (DP)/Open Ended Problem:

1) Using J2EE JSP/Servlet API develop student's management system required to manage student's academic activity such as student's profile, student's day to day assignment submission as per instructions and assignment given by teacher . Provide MVC based interface using spring framework and do the database design using Hibernet framework and also provide two login roles

one for teachers providing assignment and notification for class and other for students to submit their assignments and can view notices published by teachers

2) Develop the students blog and online forum where various group of students can do discussion on various academic and non-academic but technical topics discussions group where all of college teachers can provide comments and likes and dislikes. Use Spring base and Hibernet technology for MVC framework and database design respectively

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07)
THEORY OF COMPUTATION
SUBJECT CODE:2160704
B.E. 6thSEMESTER

Type of course: Core

Prerequisite: Calculus, Data Structures and Algorithms

Rationale: Theory of computation teaches how efficiently problems can be solved on a model of computation, using an algorithm. It is also necessary to learn the ways in which computer can be made to think. Finite state machines can help in natural language processing which is an emerging area.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
				Theory Marks			Practical Marks			
L	T	P	C	ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	0	3	70	20	10	0	0	0	100

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Review of Mathematical Theory**: Sets, Functions, Logical statements, Proofs, relations, languages, Mathematical induction, strong principle, Recursive definitions	**10**	16
2	**Regular Languages and Finite Automata:** Regular expressions, regular languages, applications, Automata with output-Moore machine, Mealy machine, Finite automata, memory requirement in a recognizer, definition, union, intersection and complement of regular languages.Non Determinism Finite Automata, Conversion from NFA to FA, $\wedge$- Non Determinism Finite Automata Conversion of NFA- $\wedge$ to NFA and equivalence of three Kleene's Theorem, Minimization of Finite automata Regular And Non Regular Languages – pumping lemma.	**12**	20
3	**Context free grammar (CFG):** Definition, Unions Concatenations And Kleen's of Context free language Regular grammar, Derivations and Languages, Relationship between derivation and derivation trees, Ambiguity Unambiguous CFG and Algebraic Expressions BacosNaur Form (BNF), Normal Form – CNF	**12**	20
4	**Pushdown Automata, CFL And NCFL:** Definition, deterministic PDA, Equivalence of CFG and PDA, Pumping lemma for CFL, Intersections and Complements of CFL, Non-CFL	**12**	20
5	**Turing Machine (TM):** TM Definition, Model Of Computation And Church Turning Thesis, computing functions with TM, Combining TM, Variations Of TM, Non Deterministic TM, Universal TM, Recursively and Enumerable Languages, Context sensitive languages and Chomsky hierarchy	**12**	20

6	**Computable Functions:** Partial, total, constant functions, Primitive Recursive Functions, Bounded Mineralization, Regular function, Recursive Functions	**2**	4

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**25**	**25**	**5**	**00**	**00**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. An introduction to automata theory and formal languages By Adesh K. Pandey, Publisher: S.K. Kataria& Sons
2. Introduction to computer theory By Deniel I. Cohen , Joh Wiley & Sons, Inc
3. Computation: Finite and Infinite By Marvin L. Minsky Prentice-Hall
4. Compiler Design By Alfred V Aho, Addison Weslley
5. Introduction to the Theory of Computation By Michael Sipser
6. Automata Theory, Languages, and Computation By John Hopcroft, Rajeev Motowani, and Jeffrey Ullman

Course Outcome:

After learning the course the students should be able to:

1. At the end of the course the students will be able to understand the basic concepts and application of Theory of Computation.
2. Students will apply this basic knowledge of Theory of Computation in the computer field to solve computational problems and in the field of compiler also.

List of Open Source Software/learning website:

1. http://en.wikipedia.org/wiki/Theory_of_computation
2. http://meru.cecs.missouri.edu/courses/cecs341/tc.html

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) ,INFORMATION TECHNOLOGY (16) and INFORMATION & COMMUNICATION TECHNOLOGY (32)
WEB TECHNOLOGY
SUBJECT CODE: 2160708
B.E. 6thSEMESTER

Type of course: Core course

Prerequisite: Fundamentals of Programming and Networking

Rationale: The wide spread use of the Internet and WWW by common people has made it compulsion to provide web based interface for the applications to access the application from anywhere, anytime, anyone. The subject covers the wide range of web technologies both client side and server side to provide the exposure to the students to develop Rich Internet Applications using them. It covers the basics WWW, client side technologies like HTML, CSS and DHTML including JavaScript, server side scripting with PHP and database connectivity using PHP and related technologies.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
3	0	2	5	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction** : Concept of WWW, Internet and WWW, HTTP Protocol : Request and Response, Web browser and Web servers, Features of Web 2.0	04	7%
2	**Web Design**: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation	04	8%
3	**HTML** : Basics of HTML, formatting and fonts, commenting code, color, hyperlink, lists, tables, images, forms, XHTML, Meta tags, Character entities, frames and frame sets, Browser architecture and Web site structure. Overview and features of HTML5	10	20%
4	**Style sheets** : Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2, Overview and features of CSS3	04	10%
5	**JavaScript** : Client side scripting with JavaScript, variables, functions, conditions, loops and repetition, Pop up boxes, Advance JavaScript: Javascript and objects, JavaScript own objects, the DOM and web	10	20%

	browser environments, Manipulation using DOM, forms and validations, DHTML : Combining HTML, CSS and Javascript, Events and buttons		
6	**XML** : Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Using XML with application. Transforming XML using XSL and XSLT	04	10%
7	**PHP** : Introduction and basic syntax of PHP, decision and looping with examples, PHP and HTML, Arrays, Functions, Browser control and detection, string, Form processing, Files, Advance Features: Cookies and Sessions, Object Oriented Programming with PHP	08	15%
8	**PHP and MySQL** : Basic commands with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names, creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs	04	10%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
12	**20**	**24**	**6**	**4**	**4**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India
2. Web Technologies, Black Book, dreamtech Press
3. HTML 5, Black Book, dreamtech Press
4. Web Design, Joel Sklar, Cengage Learning
5. Developing Web Applications in PHP and AJAX, Harwani, McGrawHill
6. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel, Pearson

Course Outcome:

After completion of the course students will be able to

1. Describe the concepts of WWW including browser and HTTP protocol.
2. List the various HTML tags and use them to develop the user friendly web pages.
3. Define the CSS with its types and use them to provide the styles to the web pages at various levels.
4. Develop the modern web pages using the HTML and CSS features with different layouts as per need of applications.
5. Use the JavaScript to develop the dynamic web pages.
6. Use server side scripting with PHP to generate the web pages dynamically using the database connectivity.
7. Develop the modern Web applications using the client and server side technologies and the web design fundamentals.

List of Experiments:

Practical list should be prepared based on the content of the subject with following guidelines in mind.

1. Entire syllabus should be covered.
2. Practical list should be designed with real life examples.
3. List should be prepared to cover individual concepts and integration of different concepts on real life problems.

Design based Problems (DP)/Open Ended Problem:

1. Develop an attractive Web site for an event to be organized in your institute.
2. Develop a Web based application to manage the Visiting Cards which allows user to add new cards, delete the cards, update the cards etc.
3. Develop a web based application for online purchasing of products with payment facility

Major Equipment:

- Modern PC with Web server software installed or accessible through LAN

List of Open Source Software/learning website:

- Browsers like IE, Mozila, FireFox etc
- Server software XAMPP/WAMP/LAMP
- www.apachefriends.org
- www.w3.org
- www.w3schools.com
- www.php.net
- www.mysql.com
- www.phpmyadmin.net

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07)
COMPUTER GRAPHICS
SUBJECT CODE: 2160703
B.E. 5th SEMESTER

Type of course: Under Graduate

Prerequisite: C, C++, Linear algebra, Matrices

Rationale: To understand the basics of various inputs and output computer graphics hardware devices as well as the course will offers an in-depth exploration of fundamental concepts in 2D and 3D computer graphics. After introducing 2D raster graphics techniques, the course focuses on 3D modeling, geometric transformations, 3D viewing and rendering. This course presents an introduction to computer graphics designed to give the student an overview of fundamental principles.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Basic of Computer Graphics:** Basic of Computer Graphics, Applications of computer graphics, Display devices, Random and Raster scan systems, Graphics input devices, Graphics software and standards	06	15
2	**Graphics Primitives:** Points, lines, circles and ellipses as primitives, scan conversion algorithms for primitives, Fill area primitives including scan-line polygon filling, inside-outside test, boundary and flood-fill, character generation, line attributes, area-fill attributes, character attributers.	08	20
3	**2D transformation and viewing:** Transformations (translation, rotation, scaling), matrix representation, homogeneous coordinates, composite transformations, reflection and shearing, viewing pipeline and coordinates system, window-to-viewport transformation, clipping including point clipping, line clipping (cohen-sutherland, liang- bersky, NLN), polygon clipping	08	20
4	**3D concepts and object representation:** 3D display methods, polygon surfaces, tables, equations, meshes, curved lies and surfaces, quadric surfaces, spline representation, cubic spline interpolation methods, Bazier curves and surfaces, B-spline curves and surfaces	06	15
5	**3D transformation and viewing:** 3D scaling, rotation and translation, composite transformation, viewing pipeline and coordinates, parallel and perspective transformation, view volume and general (parallel and perspective) projection transformations	08	20
6	**Advance topics:**	06	10

	visible surface detection concepts, back-face detection, depth buffer method, illumination, light sources, illumination methods (ambient, diffuse reflection, specular reflection), Color models: properties of light, XYZ, RGB, YIQ and CMY color models		

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	20	15	10	5	5

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Computer Graphics, D.Hearn And P.Baker - Pearson Eduction - C Version
2. Computer Graphics, with OpenGL Hearn and Baker, - Pearson
3. Computer Graphics, Sinha & Udai, - TMH
4. Computer Graphics, Foley and van Dam - Person Education

Course Outcome:

After learning the course the students should be able to:

1. To understand the various computer graphics hardware and display technologies.
2. 2D and 3D viewing technologies
3. Various 2D and 3D objects transformation techniques.

List of Experiments:

1. To study the various graphics commands in C language.
2. Develop the DDA Line drawing algorithm using C language
3. Develop the Bresenham's Line drawing algorithm using C language
4. Develop the Bresenham's Circle drawing algorithm using C language
5. Develop the C program for to display different types of lines
6. Perform the following 2D Transformation operation Translation , Rotation and Scaling
7. Perform the Line Clipping Algorithm
8. Perform the Polygone clipping algorithm
9. Perform the following tasks using MATLAB commands.
   - Read the grayscale and color image.
   - Display images on the computer monitor
   - Write images in your destination folder.
10. Generate the complement image using MATLAB.

Design based Problems (DP)/Open Ended Problem:

1. By using the various geometrics transformation techniques, students can develop the various gaming software and also able to perform the animation concept.

Major Equipment:

1. Computer systems with high RAM.

List of Open Source Software/learning website:

1. GIMP - GNU Image Manipulation Program
2. Inkscape - Open Source vector graphics editor
3. C Compiler

ACTIVE LEARNING ASSIGNMENTS: Preparation of power-point slides, which include videos, animations, pictures, graphics for better understanding theory and practical work – The faculty will allocate chapters/ parts of chapters to groups of students so that the entire syllabus to be covered. The power-point slides should be put up on the web-site of the College/ Institute, along with the names of the students of the group, the name of the faculty, Department and College on the first slide. The best three works should submit to GTU.

GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) AND INFORMATION TECHNOLOGY (16)
EMBEDDED & VLSI DESIGN
SUBJECT CODE: 2160709
B.E. 6thSEMESTER

Type of course: Elective

Prerequisite: NA

Rationale: NA

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction to Embedded Systems** History of embedded systems, Classification of embedded systems, Major application area of embedded systems, Purpose of embedded systems, Fundamental issues in hardware software co-design, Introduction to unified modeling language (UML)	06	15
2	**Typical Embedded Systems** Core of the Embedded Systems, Memory, Sensors and actuators, Communication interface, Embedded firmware	10	15
3	**Embedded product development life cycle** Product enclosure design tool, Product enclosure development techniques, Objective of EDLC, Different phases of EDLC and approaches	8	10
4	Introduction and fabrication of MOSFET VLSI Design Flow, Design hierarchy, Design Methodology, nMOS,pMOS,CMOS fabrication process	4	10
5	MOS Transistor Metal Oxide Semiconductor (MOS) structure, The MOS System under external Structure &Operation of MOS transistor, MOSFET Current-Voltage characteristics Introduction, Resistive load Inverter Inverter with n-type MOSFET load (Enhancement & Depletion type MOSFET load) CMOS Inverter	12	20
6	MOS combinational, sequential and dynamic logic circuits Introduction, MOS logic circuits with Depletion nMOS Loads CMOS logic circuits, Complex logic circuits, CMOS Transmission Gates (Tgs) Introduction, Behaviour of Bistable elements, The SR latch circuit Clocked latch & Flip-flop circuit, CMOS D-latch & Edge-triggered flip-	8	15

	flop		
7	Chip input and output On chip Clock Generation and Distribution Latch –Up and its Prevention	4	5
8	Design for testability Introduction, Fault types and models, Controllability and observability, Ad Hoc Testable design techniques, Scan –based techniques	4	10

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**15**	**15**	**10**	**10**	**05**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Introduction to Embedded Systems by shibu K V mcgraw hill
2. System Design: A Unified Hardware/Software Introduction by Frank Vahid and Tony D. Givargis, Addison Wesley, 2002.
3. Sung-Mo-Kang, UsufLeblebici ,CMOS digital integrated circuits: Analysis and Design, Tata McGrawhill,2003
4. Douglas Pucknell, Basic VLSI Design,PHI, 1999
5. The AVR microcontroller and Embedded Systems by muhammad Ali Mazidi, Sarmad Naimi, Sepehr Naimi
6. Computers as Components by Wayne Wolf, Morgan Kaufmann, 2001
7. Embedded C programming and the ATMEL AVR by Barnett, cox and o'cull, Thomson
8. Wayne Wolf ,Modern VLSI Design., Person Education, 2001
9. John Uyemura ,Introduction to VLSI circuits and systems, Wiley, 2002

Course Outcome:

After completion of the course students will be able to

1. Will learn various peripheral components.
2. Use AVR Programming to interface various peripherals.
3. Able to visualize the design of an embedded system to unified modeling language.
4. Able to analyze and document various development cycle for the embedded system

List of Experiments:

1. Flash/toggle/on-off single LED.
2. Alternate ON-OFF eight LEDs.
3. Display 0 to 9 on segment
4. Multiplexed 4 7-segment & do following:
   IfSW1 press, display 0 to 9

If SW2 press, display 00 to 99
If SW3 press, display 000 to 999
If SW4 press, display 0000 to 9999

5. Transmit “Hello World!” serially and display on monitor and Transmit and receive the data in serially
6. Display the string on LCDEx.; “Hello World” and Display the string on LCD using 4 pin Ex.; “Hello World”
7. Press any key from 4*4 keypad and display on LCD. And Assume one password is stored in system. Enter password using keypad and Check whether is correct or wrong and display status on LCD
8. To implement all logic gates using VHDL.
9. To implement all logic gates using behavioral method
10. To implement eight different logic gates with the help of 3-bit selection line.
11. To implement all flip-flops (s-r, j-k, t, d) using.
12. To implement half adder with data flow, structural and behavioral method.
13. To implement full-adder with data flow, structural and behavioral method.
14. To implement 8:1 multiplexer.
15. To implement 2:4 line decoder.
16. To implement 4-bit adder.
17. To implement 4-bit comparator.
18. To implement BCD to 7-segment decoder using VHDL
19. To design sequence detector (a) Mealy model (b) Moore model

Design based Problems (DP)/Open Ended Problem:

VHDL/Verilog based mini project with emphasis on design and implementation is Compulsory:

Design small processing element using VHDL/Verilog Hardware description having adders, subtractions, and multiplying operations with counting facility

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GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) AND INFORMATION TECHNOLOGY (16)
DISTRIBUTED OPERATING SYSTEM
SUBJECT CODE: 2160710
B.E. 6thSEMESTER

Type of course: Elective

Prerequisite: Operating Systems, Distributed Network

Rationale: To examine the fundamental principles of distributed systems, and provide students hands-on experience in developing distributed protocols. While we still look at issues in distributed operating systems, this course will address distributed systems in a broader sense. Emphasis will be placed on communication, process, naming, synchronization, consistency and replication, and fault tolerance.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction to distributed Systems:** Definition and goals, Hardware and Software concepts, Design issues	06 hours	15%
2	**Communication in Distributed System:** Computer Network and Layered protocols, Message passing and related issues, synchronization, Client Server model & its implementation, remote procedure call and implementation issues, Case Studies: SUN RPC, DEC RPC	02 hours	5%
3	**Synchronization in distributed systems:** Clock synchronization and related algorithms, mutual exclusion, Deadlock in distributed systems	04 hours	10%
4	**Processes and processors in distributed systems:** Threads, system model, processor allocation, scheduling in distributed systems: Load balancing and sharing approach, fault tolerance, Real time distributed systems, Process migration and related issues	03 hours	10%
5	**Distributed File Systems:** Introduction, features & goal of distributed file system, file models, file accessing models, file sharing semantics, file caching scheme, file replication, fault tolerance, trends in distributed file system, case study.	04 hours	10%
6	**Distributed Shared Memory:** Introduction, general architecture of DSM systems, design and implementation issues of DSM, granularity, structure of shared memory space, consistency models, replacement strategy, thrashing	05 hours	15%

7	**Naming** Overview, Features, Basic concepts, System oriented names, Object locating mechanisms, Issues in designing human oriented names, Name caches, Naming and security, DNS	04 hours	10%
8	**Distributed Web-based Systems** Architecture, Processes, Communication, Naming, Synchronization, Consistency and Replication: Web Proxy Caching, Replication for Web Hosting Systems, Replication of Web Applications	03	10%
9	**Security** Introduction of Security in Distributed OS, Overview of security techniques, features, Need, Access Control, Security Management	03	10%
10	**Case Study** Java RMI, Sun Network File System, Google case study	03	5%

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
20	**20**	**10**	**10**	**5**	**5**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Distributed Operating Systems Concepts and Design, Pradeep K. Sinha, PHI
2. Distributed Systems: Concepts and Design by George Coulouris, Jean Dollimore,Tim Kindberg, Pearson
3. Distributed Operating Systems by Andrew S Tannebaum, Pearson
4. Distributed Computing by Sunita Mahajan & Seema Shah OXFORD
5. Distributed Systems: Principles and Paradigms by Andrew S Tanebaum, Maarten Van Steen, PHI
6. Distributed Computing, Fundamentals, Simulations and Advanced topics, 2nd Edition, Hagit Attiya and Jennifer Welch, Wiley India

Course Outcome:

After learning the course the students should be able to:

1. List the principles of distributed systems and describe the problems and challenges associated with these principles.
2. Understand Distributed Computing techniques, Synchronous and Processes.
3. Apply Shared Data access and Files concepts.
4. Design a distributed system that fulfills requirements with regards to key distributed systems properties.
5. Understand Distributed File Systems and Distributed Shared Memory.
6. Apply Distributed web-based system.
7. Understand the importance of security in distributed systems

List of Experiments:

1. Write a Program to implement Concurrent Echo Client Server Application.
2. Write the Programs for Remote Procedure call.
3. Write the Programs for Remote Method Invocation.
4. Write the Programs for Thread Programming in JAVA.
5. Implement CORBA file.
6. Write a Program to Increment a Counter in Shared Memory.
7. Implement Network File System (NFS).
8. Creation of a BPEL (Business Process Execution Language) Module and a Composite Application.
9. Study of Web Service Programming.
10. Study of Grid Services using various Tools.

Design based Problems (DP)/Open Ended Problem:

1. Discuss various Distributed Resource Management System Functions.
2. Compare Peer-to-Peer and Client-Server Networking
3. Discuss the various steps to configure Print Server in Windows Environment

List of Open Source Software/learning website:

- http://cquestionbank.blogspot.com
- www.intelligentedu.com/
- www.hermetic.ch/cfunlib.htm
- N.P.T.E.L. Video Lecture Series
- N.I.T.T.I. Instructional Resources Videos.
- www.cprogramming.com/
- www.c-program.com/

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GUJARAT TECHNOLOGICAL UNIVERSITY

COMPUTER ENGINEERING (07) AND INFORMATION TECHNOLOGY (16)
DOT NET TECHNOLOGY
SUBJECT CODE:2160711
B.E. 6thSEMESTER

Type of course: Elective

Prerequisite: Concepts of Object oriented programming approach

Rationale: Object oriented programming has gain momentum because of the object reuse. .NET provides object oriented development framework. .NET provides a base class library that supports innovative web development. It enables to fulfill varied functions like graphic rendering and file reading. It has all the resources to provide websites with different functionality and manage it smoothly at the same time. .NET provides Consistent programming model, Direct Support for Security, Simplified Development efforts and Easy application deployment and Maintenance.

Teaching and Examination Scheme:

Teaching Scheme			Credits	Examination Marks						Total Marks
L	T	P	C	Theory Marks			Practical Marks			
				ESE (E)	PA (M)		ESE (V)		PA (I)	
					PA	ALA	ESE	OEP		
4	0	2	6	70	20	10	20	10	20	150

Content:

Sr. No.	Content	Total Hrs	% Weightage
1	**Introduction to .NET Framework:** NET framework, MSIL, CLR, CLS, CTS, Namespaces, Assemblies The Common Language Implementation, Assemblies, Garbage Collection, The End to DLL Hell - Managed Execution	2	7%
2	**C# - The Basics and Console Applications in C#:** Name Spaces - Constructor and Destructors, Function Overloading & Inheritance, Operator Overloading, Modifiers - Property and Indexers , Attributes & Reflection API, When to use Console Applications - Generating Console Output, Processing Console Input	4	14
3	**C#.NET:** Language Features and Creating .NET Projects, Namespaces Classes and Inheritance -, Namespaces Classes and Inheritance -, C, Exploring the Base Class Library -, Debugging and Error Handling -, Data Types -, Exploring Assemblies and Namespaces, String Manipulation ,Files and I/O ,Collections	2	7
4	**ADO.NET:** Benefits of ADO.NET, ADO.NET compared to classic ADO -, Datasets, Managed Providers -, Data Binding: Introducing Data Source Controls -, Reading and Write Data Using the SqlDataSource Control	3	12
5	**Windows Forms and Controls in details:** The Windows Forms Model, Creating Windows Forms Windows Forms Properties and Events, Windows Form Controls, Menus - Dialogs – ToolTips	2	7

6	**Visual Inheritance in C#.NET:** Apply Inheritance techniques to Forms, Creating Base Forms, Programming Derived Forms	**2**	7
7	**Mastering Windows Forms:** Printing - Handling Multiple Events, GDI+, Creating Windows Forms Controls	**3**	12
8	**ASP.NET:** Introduction to ASP.NET, Working with Web and HTML Controls, Using Rich Server Controls, Login controls, Overview of ASP.NETValidation Controls, Using the Simple Validations, Using the Complex Validators Accessing Data using ADO.NET, Using the Complex Validators Accessing Data using ADO.NET, Configuration Overview	**3**	12
9	**Themes and Master Pages:** Creating a Consistent Web Site, ASP.NET 2.0 Themes - Master Pages, Displaying Data with the GridView Control Introducing the GridView Control, Filter Data in the GridView Control, Allow Users to Select from a DropDownList in the Grid, Add a Hyperlink to the Grid, Deleting a Row and Handling Errors	**2**	7
10	**Managing State:** Preserving State in Web Applications and Page-Level State, Using Cookies to Preserve State, ASP.NET Session State ,Storing Objects in Session State, Configuring Session State, Setting Up an Out-of-Process State Server, Storing Session State in SQL Server, Using Cookieless Session IDs, Application State Using the DataList and Repeater Controls, Overview of List-Bound Controls, Creating a Repeater Control and DataList Control	**3**	12
11	**Creating and Consuming Web Services:** The Motivation for XML Web Services, Creating an XML Web Service with Visual Studio, Designing XML Web Services, Creating Web Service Consumers, Discovering Web Services Using UDDI	**2**	2
12	**Advanced in .NET:** Introduction to Windows Presentation Foundation (WPF), Window Communication Foundation and its Application	**2**	1

Suggested Specification table with Marks (Theory):

Distribution of Theory Marks					
R Level	U Level	A Level	N Level	E Level	C Level
15	**20**	**35**	**00**	**00**	**00**

Legends: R: Remembrance; U: Understanding; A: Application, N: Analyze and E: Evaluate C: Create and above Levels (Revised Bloom's Taxonomy)

Note: This specification table shall be treated as a general guideline for students and teachers. The actual distribution of marks in the question paper may vary slightly from above table.

Reference Books:

1. Christian Nagel, Professional C# .Net, Wrox Publication
2. Matthew Macdonald and Robert Standefer, ASP.NET Complete Reference, TMH
3. Vijay Mukhi, C# The Basics, BPB Publications

Course Outcome:

After learning the course the students should be able to:

1. Use .net framework architecture, various tools, and Validation techniques, use of different templates available in Visual Studio, Implementation and testing strategies in real time applications.
2. Use advanced concepts related to Web Services, WCF, and WPF in project development

List of Experiments:

1) Write a program to check whether empty query string is entered in Asp .net
2) Write a program to change color of Label text control programmatically in Asp .Net
3) Write a program to Enable-Disable Textbox and change width of TextBox programmatically in Asp .Net
4) Write a program to increase and decrease font size programmatically.
5) Write C# code to display the asterisk pattern as shown below:

   *****
   *****
   *****
   *****
   *****

6) Write C# code to prompt a user to input his/her name and country name and then the output will be shown as an example below:

   Hello Ram from country India!

7) Write C# code to do the following

   - Convert binary to decimal
   - Convert decimal to hexadecimal
   - Convert decimal to binary
   - Convert decimal to octal

8) Write C# code to convert infix notation to postfix notation.
9) Write a C# code to convert digits to words
10) Write a C# code to Convert following currency conversion.

    Rupees to dollar, frank, euro.

11) Write a C# code to Perform Celsius to Fahrenheit Conversion and Fahrenheit to Celsius conversion.
12) Write ASP.Net program to Store Objects in Session State and Storing Session State in SQL Server.

Design based Problems (DP)/Open Ended Problem:

1) Design and develop a tool that inspects every web request.
2) Develop a powerful cross platform game.

Major Equipment:

Desktop, Laptop

List of Open Source Software/learning website:

www.c-sharpcorner.com
www.csharp-station.com/Tutorial.aspx

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