GUJARAT TECHNOLOGICAL UNIVERSITY (GTU)

Competency-focused Outcome-based Green Curriculum-2023 (COGC-2023)
Semester-VI

Course Title: Software Development
(Course Code: 4361604)

Diploma program in which this course is offered	Semester in which offered
Information Technology	6th

1. RATIONALE

The world of software development is always evolving, with new technologies, tools, and approaches emerging at a rapid pace. The software development industry continues to expand with remarkable advancements in technology. It has revolutionized every area of human life like education, health, defense and security, finance and business, travel, social life, politics, entertainment and so on. The list of latest and promising software development trends includes Artificial Intelligence, Cybersecurity, Progressive Web Applications, Block-chain Adoption, Mixed Reality, The Internet of Things (IoT), Distributed Cloud Services, Software Outsourcing, Low-code Development, and Software Quality Standards. This course guides the students to analyze, design, implement and test the software product with proper documentation.

2. COMPETENCY

The purpose of this course is to help the student in development of software.

- **Develop multiple types of skills such as planning, communication, collaboration, decision making / Problem solving and management skills along with selected technical knowledge.**

3. COURSE OUTCOMES (COs)

The practical exercises, the underpinning knowledge and the relevant soft skills associated with the identified competency are to be developed in the student for the achievement of the following COs:

a) Select and apply appropriate process model for software project.
b) Prepare software requirement specification (SRS) document and design of the software with user interface for a software project.
c) Organize software project development schedule.
d) Develop front end and back end coding of software project.
e) Apply testing on software product with proper test cases.

4. TEACHING AND EXAMINATION SCHEME

Teaching Scheme (In Hours)			Total Credits (L+T+P/2)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	T	P	C	CA	ESE	CA	ESE	
0	0	6	3	0	0	25	25	50

1. **Industry Defined Project:** CA will be carried out by industry resource person/project guide and ESE will be carried out by university examiner.

2. **User Defined Project:** CA will be carried out by institute resource person/project guide and ESE will be carried out by university examiner.

Legends: L*-Lecture;* ***T*** *– Tutorial/Teacher Guided Theory Practice;* ***P*** *-Practical;* ***C*** *– Credit,* ***CA*** *- Continuous Assessment;* ***ESE*** *-End Semester Examination.*

5. COURSE DETAILS

Unit	Major Learning Outcomes (in cognitive domain)	Topics and Sub-topics
Unit-I Software Development Process Model	1.1. Defining the problem definition for the project.	1.1.1 Defining the problem definition for the project. 1.1.2 Analysis on problem definition.
	1.2 Select Software development models for project.	1.2.1 Software Development Models • Waterfall Model • Incremental Model RAD Model • Prototyping Model • Spiral Model • Agile Model
Unit-II Software analysis & design	2.1. Identify software requirement	2.1.1 Requirement gathering –collect requirements from stakeholders 2.1.2 Analyze the requirements
	2.2. Analyze and design requirement	2.2.1 Analyze the requirements 2.2.2 Identify functional and non-functional requirements for the project. 2.2.3 Prepare software design
Unit-III Software Project Management	3.1. Prepare and manage Schedule for different software development activities	3.1.1 Estimate the size of the project. 3.1.2 Estimate the cost and development time of the project. 3.1.3 Estimate resources required for a project. 3.1.4 Prepare schedule for the project.
Unit-IV Software Implementation/ Coding	4.1. Develop Front end implementation.	4.1.1 Introduction to Front end development. 4.1.2 What Front-End Developers Should Know? 4.1.3 How Front-End Communicates with the BackEnd? 4.1.4 Most Popular Front-End Development Languages
	4.2. Develop Back end implementation.	4.2.1 Introduction to Back end development. 4.2.2 What Back-End Developers Should Know? 4.2.3 Most Popular Back-End Development Languages
Unit-V Software Coding and Testing	5.1 Follow coding standards	5.1.1 Coding standards and guidelines 5.1.2 Code review
	5.2 Test the software with proper test cases	5.2.1 Testing – Test cases and test suit – Verification, Validation – Unit testing – Black-box testing – White-box testing

List of Documents to be prepared for Submission:

- Detail report duly signed and approved by the internal/external mentor/guide.
- Presentation regarding software project approved by the internal/external mentor/guide.
  Poster regarding software project approved by the internal/external mentor/guide.

Common Note:

1) For Projects / Seminar etc. Evaluation is based on work done, quality of report, performance in viva-voce, presentation etc. The internal / external assessment is based on the student's performance in viva-voce /work record respectively.

6. AFFECTIVE DOMAIN OUTCOMES

The following affective Domain Outcomes (ADOs) are embedded in many of the above mentioned COs. More could be added to fulfill the development of this course competency.

a) Work as a leader/a team member as role of Engineer.
b) Practice environment friendly methods and processes.
c) Follow safety precautions and ethical practices.

7. SUGGESTED STUDENT ACTIVITIES

Following are the suggested student-related curricular, **co-curricular** activities which can be undertaken to accelerate the attainment of the various outcomes in this course: Students should perform following activities and prepare reports and give presentation in front of students and faculty members. They should also collect/record physical evidences for their (student's) portfolio which may be useful for their placement interviews:

a) Perform various tasks given by industry resources person during software development in IDP projects.
b) Perform various task required to complete software development work under guidance of institute faculty member in UDP projects.
c) Students are required to give a presentation before review committee consisting of a group of academic staff members.
d) At the end of the software development make a poster presentation of the work carried out. The poster presentation is open to the public. It is also evaluated by faculty members.

8. SOFTWARE / LEARNING WEBSITES

A software development is a short term work program usually offered to students by companies and institutes who require staff for assistance at junior levels. Thus for the students undergoing software development work are get a professional learning experience is provided to benefit them in their skills as well as career. It will brush existing skills and provide exposure to new skills.

Here is a suggestive list for reference only.

- http://www.gksgujarat.org/
- https://anubandham.gujarat.gov.in/home
- https://kaushalyaskilluniversity.ac.in/
- https://www.internshala.com
- https://swayam.gov.in
- https://nptel.ac.in/
- https://neat.aicte-india.org/
- https://www.edx.org/
- https://www.coursera.org/

- https://www.udemy.com/
- https://www.linkedIn.com
- https://www.stumags.com
- https://www.glassdoor.com

PO-COMPETENCY-CO MAPPING

Semester VI	Software Development (Course Code: 4361604)						
	POs						
Competency & Course Outcomes	PO 1 Basic & Discipline specific knowledge	PO 2 Problem Analysis	PO 3 Design/ development of solutions	PO 4 Engineering Tools, Experimentation & Testing	PO 5 Engineering practices for society, sustainability & environment	PO 6 Project Management	PO 7 Life-long learning
CO1) Select and apply appropriate process model for software project.	3	2	3	2	-	2	3
CO2) Prepare software requirement specification(SRS) document and design of the software with user interface for a software project.	3	3	3	3	-	3	3
CO3)Organize software project development schedule.	2	2	3	3	-	3	3
CO4) Develop front end and back end coding of software project.	2	3	3	3	2	3	3
CO5) Apply testing on software product with proper test cases.	2	2	3	3	-	3	3

*Legend: '**3**' for high, '**2**' for medium, **'1'** for low and **'-'** for no correlation of each CO with PO.*

9. COURSE CURRICULUM DEVELOPMENT COMMITTEE

Sr. No.	Name and Designation	Institute	Email
1	Dr. Gaurang V. Lakhani, HOD,IT, I/c Principal	G.P. Bhuj	gvlakhani1@gmail.com
2	Mr. Bhavin P. Mistry, Lecturer in I.T.	G.P. Himatnagar	mistry.1987@gmail.com
3	Ms. Amisha Patel, Lecturer in I.T.	G.P. Valsad	patelamisha61@gmail.com

Sample forms for Registration and Evaluation of software project are given below:

1. Registration Form is mandatory to be filled at the commencement of software development.

2. Mapping will be done to ease CA and ESE Evaluations.
3. A Seminar / Webinar can be arranged so that students coming from different industry / institute / project background can share experiences and learnings to their peers / all students of the same department.
4. Attached formats for Registration and Evaluation are suggestive.

Software Development Registration Form

Note: Students needs to submit this registration form after finalizing mode of software development.

Student Details												
Enrollment Number												
Student Name												
Student Details	Mobile Number :											
	Email Address:											
Branch												
Code of the Institute	Name of the Institute											
Mentor Details (Institute)	Name:											
	Designation:											
	Mobile No:											
	Email Address:											
Industry Details	Name:											
	Address:											
	Email:											
	Phone:											
	Website:											
Mentor Details (Industry)	Name:											
	Designation:											
	Mobile No:											
	Email Address											
Mode of project Carried Out	UDP/IDP											
Title of the Project carried out												
Nature of Work Carried Out	Web Design / Application development (Web / Mobile), Experimental results/ simulations/ Analysis of System(s) etc… Other please Specify_____											

Student Signature

Faculty Signature

Software Development Evaluation Rubrics for Institute

Evaluation Rubrics (Institute)

Enrollment No: Branch: _____ Name of the Student: _____

Date of Evaluation: _____

Internal Evaluation – 25 Marks PA(I)					
Parameter	**Excellent**	**Good**	**Average**	**Not up the level of Satisfaction**	**Obtained Marks**
Mark	**5**	**4**	**3**	**Below 2**	
Technical knowledge and awareness related to the specific discipline. **05 marks**					
Attendance and punctuality during the software development work**. 05 marks**					
Receiving and providing feedback during the software development work.**05 marks**					
Team work in the organization and adaptation capacity**. 05 marks**					
Report writing and Presentation Skill. **05 marks**					
Total Marks Obtained Out of 25 PA(I)					

Signature: _____ Examiner Name: _____

Enrollment No:_____ Branch: _____ Name of the Student: _____

Date of Evaluation:

_____

External Evaluation – 25 Marks ESE(V)					
Parameter	**Excellent**	**Good**	**Average**	**Not up the level of Satisfaction**	Obtained Marks
Mark	**5**	**4**	**3**	**Below 2**	
Demonstrates skills needed for assigned tasks and effective use of engineering tools and techniques. **(05 Marks)**					
Maintains professional manner/appearance and Manages time/resources effectively**. (05 Marks)**					
student attendance and punctuality during the software development work and dedication towards work assigned. **(05 Marks)**					

Understands expectations of supervisor and seeks further guidance when appropriate. **(05 Marks)**					
Quality of industrial report and presentation skill. **(05 Marks)**					
Total Marks Obtained Out of 25 ESE(V)					

Signature: _____ **Examiner Name:** _____