GUJARAT TECHNOLOGICAL UNIVERSITY, AHMEDABAD, GUJARAT

Course Curriculum
Course Title: Fundamentals of Software Development
(Code: 3341603)

Diploma Programmes in which this course is offered	Semester in which offered
Information Technology	**4th Sem**

1.   RATIONALE

Software Engineering subject is to make the students to understand that, software is the single most important technology on the world stage. Software's are used by almost all peoples for various purposes such as withdrawing payments from ATM machines, paying bills of electricity, telephone using ECS systems. Airline, railway tickets reservation online etc. People can work with computers flawlessly over a long period of time. One can easily modify, upgrade the software without any problem or error. This subject helps the students to develop, design, analyze, test & implement the software project during the diploma courses in future.

2.   COMPETENCY

The course content should be taught and implemented with the aim to develop different types of skills so that students are able to acquire following competency:

- To develop ability to identify and analyze problems in the field of S/W development

3.   Course Outcomes:

1. Select method for software development application
2. Understand contents of a software requirement specification document
3. Prepare the schedule and Estimate Cost for managing the software Development application
4. Analyze software requirement and prepare activity and use-case diagram.
5. Explain various software testing methods

4.   Teaching and Examination Scheme

Teaching Scheme (In Hours)			Total Credits (L+T+P)	Examination Scheme				
				Theory Marks		Practical Marks		Total Marks
L	**T**	**P**	**C**	**ESE**	**PA**	**ESE**	**PA**	**150**
3	0	2	5	70	30	20	30	

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

5.   COURSE DETAILS

Unit	Major Learning Outcomes	Topics and Sub-topics
Unit-I **Software Development Process**	1a Explain Software and Software Engineering.	1.1 Software • Definition • Characteristics 1.2 Software Myths 1.3 Software Engineering – • A layered Technology approach • Definition • Need 1.4 Software development 1.5 Generic Framework activities, Umbrella activities
	1b Compare various project process models and use in project planning.	1.6 Software Development Models • Waterfall Model • Incremental Model • RAD Model • Prototyping Model • Spiral Model
Unit-II **Software Analysis and Design**	2a Identify software requirement	2.1 Requirement Gathering and Analysis 2.2 Software Requirement Specification(SRS) • Characteristic • Customer requirement • Functional Requirement
	2b Analyze and design requirement	2.3 Design Process • Classification of Design Activities • Classification of Design Methodology 2.4 Cohesion and Coupling 2.5 Data Modeling Concepts • Data Objects • Data Attributes • Relationships • Cardinality and Modality 2.6 Data-Flow Diagrams • Primitive Symbols of DFD • Develop DFD Model of System • Shortcoming of DFD Model
	2c Develop Activity and use-case diagram	2.7 Scenario-Based Modeling • Writing Use-Cases • Developing an Activity Diagram 2.8 Architectural design decisions • Architectural views • Architectural patterns

		• Application architectures
Unit-III **Software Project Management**	3a Prepare and manage Schedule for different software development activities	3.1 Responsibility of software project Manager • Job responsibility • Required skill to manage software project 3.2 Metrics for Size Estimation • Line of Code • Function Points 3.3 Project Estimation Technique • Empirical Estimation Technique • Heuristic Technique • Analytical Estimation Technique 3.4 Scheduling • Work breakdown structure • Activity network and critical path Method • Gantt Chart • Project Monitoring and control 3.5 Risk Management • Risk Identification • Risk Assessment • Risk Containment
Unit-IV **Software Coding and testing**	4a Prepare software Documentation	4.1 Code review • Code Work through • Code Inspection 4.2 Software Documentation • Internal Documentation • External Documentation
	4b Prepare test cases and test the software	4.3 Testing • Unit Testing • Black-box Testing • White-box testing 4.4 Test Documentation

6.   SUGGESTED SPECIFICATION TABLE WITH HOURS & MARKS (THEORY)

Unit No.	Unit Title	Teaching Hours	Distribution of Theory Marks			
			R Level	**U Level**	**A Level**	**Total Marks**
I	Software Development Process	10	10	08	00	18
II	Software Analysis and Design	14	04	08	10	22
III	Software Project Management	10	04	08	06	18
IV	Software Coding and testing	08	02	02	08	12
	Total	**42**	**20**	**26**	**24**	**70**

Legends: R = Remembrance; U = Understanding; A = Application 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.

7.   SUGGESTED LIST OF EXERCISES/PRACTICALS

The practical/exercises should be properly designed and implemented with an attempt to develop different types of cognitive and practical skills (Outcomes in cognitive, psychomotor and affective domain) so that students are able to acquire the competencies.
Following is the list of practical exercises for guidance.

Note: Here only outcomes in psychomotor domain are listed as practical/exercises. However, if these practical/exercises are completed appropriately, they would also lead to development of Programme Outcomes/Course Outcomes in affective domain as given in a common list at the beginning of curriculum document for this programme. Faculty should refer to that common list and should ensure that students also acquire those Programme Outcomes/Course Outcomes related to affective domain

S. No.	Unit No.	Practical Exercises (Outcomes' in Psychomotor Domain)	Hrs. required
1	I	Identify the development model for software with proper explanation	02
2	II	Gather requirement for software.	04
3	II	Prepare SRS Document for Software	04
4	II	Design Activity Diagram for system	02
5	II	Design Use-case Diagram for system	02
6	II	Design Data Dictionary of system	04
7	II	Prepare E-R Diagram of System	02
8	II	Design Data Flow Diagram of system	04
9	III	Prepare Gantt chart of system	02
10	IV	Prepare suitable test case for system testing.	02
Total			**28**

8.   SUGGESTED LIST OF STUDENT ACTIVITIES
Following is the list of proposed student activities like:
i.   Power point Presentation

9.   SPECIAL INSTRUCTIONAL STRATEGIES (if any)
Application for practical will be assigned to the students by the subject faculty and students will work in a group of 3 – 5

10.   SUGGESTED LEARNING RESOURCES

- Microsoft Visio

A)   List of Books

S. No.	Title of Book	Author	Publication
1.	Software Engineering: A Practitioner's Approach	Roger S. Pressman	Tata McGraw Hill,
2.	Software Engineering	Ian Somerville	Pearson education PHI
3.	Fundamentals of Software Engineering	Rajib Mall	PHI

B)   List of Major Equipment/ Instrument with Broad Specifications

C)   List of Software/Learning Websites

- **http://nptel.iitm.ac.in/**
- **http://www.mhhe.com/engcs/compsci/pressman/student/olc/cases.mhtml**

11.   COURSE CURRICULUM DEVELOPMENT COMMITTEE

Faculty Members from Polytechnics

1. Mr. Sunil K. Paryani, Lecturer IT, Govt. Polytechnic, Ahmadabad
2. Mr. Bhadresh G. Prajapati, Lecturer IT, Govt. Polytechnic, Himatnagar

Coordinator and Faculty Members from NITTTR Bhopal

1. Prof. (Mrs.) Susan S. Mathew
2. Dr. Joshua Earnest,