

# GOVERNMENT POLYTECHNIC, NAGPUR.

(An Autonomous Institute of Govt. of Maharashtra)

## COURSE CURRICULUM

<b>PROGRAMME</b>	<b>: DIPLOMA IN COMPUTER ENGINEERING</b>
<b>LEVEL NAME</b>	<b>: PROFESSIONAL COURSES</b>
<b>COURSE CODE</b>	<b>: CM411E</b>
<b>COURSE TITLE</b>	<b>: SYSTEM ANALYSIS AND DESIGN</b>
<b>PREREQUISITE</b>	<b>: NIL</b>
<b>TEACHING SCHEME</b>	<b>: TH: 03; TU: 00; PR: 04 (CLOCK HRs.)</b>
<b>TOTAL CREDITS</b>	<b>: 05 (1 TH/TU CREDIT = 1 CLOCK HR., 2 PR CREDIT = 2 CLOCK HR.)</b>
<b>TH. TEE EXAM</b>	<b>: 03 HRs</b>
<b>PR. TEE EXAM</b>	<b>: 02 HRs (Internal)</b>
<b>PT. EXAM</b>	<b>: 01 HR</b>

### ❖ **RATIONALE:**

In the early days of large scale information system development used variety of different System Development Life Cycle models to build systems for customer billing, payroll, stock control and a variety of other business areas. This course aims to as to introduce variety of new software used by analysts, designers to manage projects, analyze and document systems, design new systems and implement their plans. It introduces also a recent coverage of UML, and expanded coverage on RAD and GUI design.

### ❖ **COURSE OUTCOMES:**

**After completing this course students will be able to–**

1. Identify the phases of the system development life cycle.
2. Select at least five expected benefits from systems projects.
3. Identify interaction of systems analysts with users, management, and other information systems professionals.
4. Design Data Flow Diagrams, Unified Modeling Language(UML)Diagram
5. Analyze realistic systems analysis problems and determine methods for evaluating the effectiveness and efficiency of a system.
6. Apply different charts to design a system.

❖ **COURSE DETAILS:****A. THEORY :**

<b>Units</b>	<b>Specific Learning Outcomes (Cognitive Domain)</b>	<b>Topics and subtopics</b>	<b>Hrs.</b>
1.System Analysis Fundamentals	1. State the characteristics of a system 2. Enlist types of system 3. Describe the need for Systems Analysis and Design 4. Identify the Role of System Analyst	1.1 Definition of System 1.2 Assuming the Role of the Systems Analyst 1.3 Types of Systems : Transaction Processing Systems, Office Automation Systems and Knowledge Work Systems, Management Information Systems, Decision Support Systems, Expert Systems and Artificial Intelligence, Group Decision Support Systems and Computer-Supported Collaborative Work Systems, Executive Support Systems, Ecommerce Applications and Web Systems, Systems for Wireless and Handheld Devices. 1.4 Need for Systems Analysis and Design 1.5 Qualities of the System Analyst	06
2.System Development Overview	1. Describe the phases of SDLC 2. State Enterprise Resource Planning 3. Describe Systems and the Entity-Relationship model 4. Describe Processing Alternatives	2.1 Introduction: System Development life cycle(SDLC) 2.2 Phases of System Development life cycle: Identifying Problems, Opportunities, and Objectives, Determining Information Requirements, Analyzing System Needs, Designing the Recommended System, Developing and Documenting Software, Testing and Maintaining the System, Implementing and Evaluating the System 2.3 New approaches to design, Resources for new system 2.4 Processing alternatives 2.5 Organizations as Systems 2.6 Interrelatedness and Interdependence of Systems 2.7 Enterprise Resource Planning: Viewing the Organization as a System	10

		2.8 Depicting Systems Graphically 2.9 Systems and the Context-Level Data Flow Diagram 2.10 Systems and the Entity-Relationship Model 2.11 Levels of Management	
3.Managing Analysis and Design Activities and Information Gathering	1. State Problems in the organization 2. Describe feasibility studies 3. Identify Analysis and Design Activities 4. Describe Information gathering methods	3.1 Project Initiation 3.2 Problems in the Organization 3.3 Selection of Projects Determining Feasibility: Defining Objectives, Determining Resources, Judging Feasibility 3.4 Activity Planning and Control 3.5 Estimating Time Required 3.6 Gantt Charts for Project Scheduling 3.7 Using Pert Diagrams 3.8 Managing Analysis and Design Activities: Communication Strategies for Managing Teams, Project Productivity Goals, Motivating Project Team Members 3.9 Information Gathering: Interactive Methods- Interviewing: Five Steps in Interview Preparation, Question Types, Arranging Questions in a Logical Sequence Unobtrusive Methods: Sampling: The Need for Sampling, Sampling Design	10
4. Prototyping, Rapid Application Development (RAD) and Using Data Flow Diagrams	1. Compare Prototyping and Systems Development Life Cycle 2. Enlist Phases of RAD 3. Develop data flow diagrams and 4. Develop Logical and Physical Data Flow Diagram	4.1 Prototyping: Kinds of Prototypes, Prototyping as an Alternative to the Systems Development Life Cycle, Developing a Prototype, Guidelines for Developing a Prototype, Disadvantages of Prototyping, Advantages of Prototyping, 4.2 Rapid Application Development: Phases of RAD, Comparing RAD to the SDLC 4.3 Data Flow Diagrams: The Data Flow Approach to Requirements Determination, Advantages of the Data Flow Approach, Conventions Used in Data Flow Diagrams, Developing Data Flow	08

		Diagrams, Creating the Context Diagram, Creating Child Diagrams, Logical and Physical Data Flow Diagrams, Developing Logical Data Flow Diagrams, Developing Physical Data Flow Diagrams	
5. Designing Effective Output and Input	<ol style="list-style-type: none"> <li>1. Describe Output Design Objective</li> <li>2. Design Input form using different constrain</li> <li>3. Design Database and User interface</li> <li>4. Develop Use Case Diagram</li> <li>5. Draw Activity Diagram</li> </ol>	<ol style="list-style-type: none"> <li>5.1 Output Design Objectives: Designing Output to Serve the Intended Purpose, Designing Output to Fit the User, Delivering the Appropriate Quantity of Output, Providing the Output on Time, Choosing the Right Output Method</li> <li>5.2 Designing Effective Input: Good Form Design, Making Forms Easy to Fill In, Meeting the Intended Purpose, Ensuring Accurate Completion, Keeping Forms Attractive, Computer-Assisted Form Design</li> <li>5.3 Designing Databases, Designing User Interfaces</li> <li>5.4 Design Using UML: The Unified Modeling Language (UML) Concepts and Diagrams, Use Case Modeling, Use Case Symbols, Developing Use Case Diagrams, Activity Diagrams, The Importance of Using the UML for Modeling</li> </ol>	08
6. Quality Assurance and Implementing the Information System	<ol style="list-style-type: none"> <li>1. Apply Structure chart to design systems</li> <li>2. Identify Design and documentation techniques</li> <li>3. Determine methods for evaluating the effectiveness and efficiency of a system.</li> <li>4. Evaluate systems development alternatives</li> <li>5. State types of Distributed Systems</li> </ol>	<ol style="list-style-type: none"> <li>6.1 The Total Quality Management Approach: Six Sigma, Responsibility for Total Quality Management, Systems Design and Development, Modular Development, Using Structure Charts to Design Systems, Drawing a Structure Chart, Types of Modules</li> <li>6.2 Software Engineering and Documentation, Pseudocode, Procedure Manuals, Choosing a Design and Documentation Technique</li> <li>6.3 Implementing the Information System: Implementing Distributed Systems, Types of Distributed Systems Networks, Network Modeling, Training</li> </ol>	06

		Users, Training Strategies, Guidelines for Training, Evaluation, Evaluation Techniques, Evaluating the System	
<b>Total Hrs.</b>			<b>48</b>

**B. LIST OF PRACTICALS/LABORATORY EXPERIENCES/ASSIGNMENTS:**

Practicals	Specific Learning Outcomes (Psychomotor Domain)	Units	Hrs.
1	Identify the role of system analyst for a given scenario	System Analysis Fundamentals	4
2	Identify the objectives and summaries outcomes for given scenario for each SDLC phase,		4
3	Create, design and implement Data Flow Diagram using any freeware software(e.g.Edraw Max Software)for given scenario	System Development Overview	4
4	Design Organizational Diagram for Hospital Management System using any freeware software		4
5	Draw DFD for Railway Reservation System using any freeware software		4
6	Draw E-R diagram for Railway Reservation System using any freeware software		4
7	Draw Gantt Charts for Project Scheduling	Managing Analysis and Design Activities and Information Gathering	4
8	Design Structure Chart using any freeware Software	Quality Assurance and Implementing the Information System	4
9	Collect requirement for system for given scenario.		4
10	Design USE case diagrams for given scenario.	Designing Effective Output and Input	4
11	Mini Project		22
<b>Skill Assessment</b>			<b>2</b>
<b>Total Hrs</b>			<b>64</b>

## ❖ SPECIFICATION TABLE FOR THEORY PAPER:

	Units	Levels from Cognition Process Dimension			Total Marks
		R	U	A	
01	System Analysis Fundamentals	04(04)	04(00)	00(00)	08(04)
02	System Development Overview	04(04)	08(04)	00(00)	12(08)
03	Managing Analysis and Design Activities and Information Gathering	00(00)	08(08)	06(00)	14(08)
04	Prototyping, Rapid Application development (RAD) and Using Data Flow Diagrams	02(00)	04(00)	06(06)	12(06)
05	Designing Effective Output and Input	00(00)	08(08)	06(00)	14(08)
06	Quality Assurance and Implementing the Information System	00(00)	04(00)	06(06)	10(06)
	<b>Total</b>	<b>10(08)</b>	<b>36(20)</b>	<b>24 (12)</b>	<b>70 (40)</b>

R – Remember

U – Understand

A – Analyze / Apply

## ❖ QUESTION PAPER PROFILE FOR THEORY PAPER

Q. No	Bit 1			Bit 2			Bit 3			Bit 4			Bit 5			Bit 6			Option
	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	T	L	M	
01	1	R	2	1	R	2	2	R	2	2	R	2	4	R	2	1	R	2	5/7
	1	R	2																
02	1	U	4	2	U	4	2	U	4	2	R	4	2	U	4				3/5
03	3	U	4	3	U	4	4	U	4	3	U	4	3	U	4				3/5
04	5	U	4	5	U	4	6	U	4	5	U	4	5	U	4				3/5
05	3	A	6	4	A	6	4	A	6										2/3
06	5	A	6	6	A	6	6	A	6										2/3

T= Unit/Topic Number

L= Level of Question

M= Marks

R-Remember

U-Understand

A-Analyze/ Apply

## ❖ ASSESSMENT AND EVALUATION SCHEME:

	What		To Whom	Frequency	Max Marks	Min Marks	Evidence Collected	Course Outcomes
Direct Assessment Theory	CA (Continuous Assessment)	Progressive Test (PT)	Students	Two PT (average of two tests will be computed)	20	--	Test Answer Sheets	1, 2, 3
		Assignments		Continuous	10	--	Assignment Book / Sheet	1, 2, 3
	TEE (Term End Examination)	End Exam	Students	End Of the Course	70	28	Theory Answer Sheets	1, 2, 3
				Total	100	40		
Direct Assessment Practical	CA (Continuous Assessment)	Skill Assessment	Students	Continuous	20	--	Rubrics & Assessment Sheets	4,5,6
		Journal Writing		Continuous	05	--	Journal	4,5,6
				TOTAL	25	10		
	TEE (Term End Examination)	End Exam	Students	End Of the Course	50	20	Rubrics & Practical Answer Sheets	4,5,6
Indirect Assessment	Student Feedback on course		Students	After First Progressive Test	Student Feedback Form			1, 2, 3, 4,5,6
	End Of Course			End Of The Course	Questionnaires			

❖ **SCHEME OF PRACTICAL EVALUATION:**

S.N.	Description	Max. Marks
1	Identify the suitable software development model, Classify the requirement into functional and non-functional requirements.	10
2	Performance	20
3	Identify the various elicitation techniques, identify design principles, Draw sequence, state, E-R diagram, DFD, Sequence and Activity diagram.	10
5	Viva voce	10
	<b>TOTAL</b>	<b>50</b>

❖ **MAPPING COURSE OUTCOMES WITH PROGRAM OUTCOMES:**

Course Outcomes	Program Outcomes (POs)										PSOs	
	1	2	3	4	5	6	7	8	9	10	1	2
1	-	3	-	-	-	-	-	-	-	3	-	3
2	-	3	-	-	-	-	-	-	-	3	-	3
3	-	3	-	-	-	-	-	-	-	3	-	3
4	-	3	3	3	-	-	-	3	3	3	-	3
5	-	3	3	3	-	-	-	3	3	3	-	3
6	-	3	3	3	-	-	-	3	3	3	-	3

1: Slight (Low) 2: Moderate (Medium) 3: Substantial (High)

❖ **REFERENCE & TEXT BOOKS:**

S.N.	Title	Author, Publisher, Edition and Year Of publication	ISBN Number
1.	System Analysis and Design	Kendall & Kendall, Pearson 9 <sup>th</sup> Edition, 2013	10-0133023443
2.	Systems Analysis And Design	Alan Dennis, Barbara Haley Wixom, Roberta M. Roth, Wiley; 6 <sup>th</sup> edition, 2016	10-8126562951
3.	Analysis and Design of Information Systems	V. Rajaraman Prentice, Hall India Learning Private Limited; 3 <sup>rd</sup> Edition, 2011	10-8120343840
4.	Essentials of Systems Analysis	Joseph S. Valacich, Joey F. Grorger & Jeffrey A. Hoffer, Prentice Hall India Learning Private Limited; 5 <sup>th</sup> Edition, 2015	10-9332550204
5.	System Analysis & Design	S.K. Jha, S.K. Kataria & Sons, Reprint, 2008	10-8188458929



❖ **E-REFERENCES:**

- <http://www.nptelvideos.in/2012/11/systems-analysis-and-design.html?m=1>,  
assessed on 18<sup>th</sup> September 2016
- <http://www.systemanalysisanddesign.com/the-role-of-system-analyst/>,  
assessed on 18<sup>th</sup> September 2016

❖ **LIST OF MAJOR EQUIPMENTS/INSTRUMENTS WITH SPECIFICATION**

- Computer System with latest configuration
- Multimedia Projector

❖ **LIST OF EXPERTS & TEACHERS WHO CONTRIBUTED FOR THIS CURRICULUM:**

S.N.	Name	Designation	Institute / Industry
1.	Mr. S. P. Lambhade	HOD, Dept. of Computer Engineering	Government Polytechnic, Nagpur.
2	Dr.Mrs.A.R. Mahajan	Head of Information Technology	Government Polytechnic, Nagpur.
3	Ms. G. B. Chavan	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
4.	Ms. D. M. Shirkey	Lecturer in Computer Engineering	Government Polytechnic, Nagpur.
5	Mr. L. D. Vilhekar	Lecturer in Information Technology	Government Polytechnic, Nagpur.
6.	Prof. Manoj Jethawa	HOD Computer Science	Shri Datta Meghe Polytechnic, Nagpur
7	Prof. N.V.Chaudhari	Asst.Professor(CSE)	DBACEO, Wanadongari, Nagpur
8	Mr. Atul Upadhay	CEO	Vista Computers, Ram Nagar, Nagpur

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 (Member Secretary PBOS)

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 (Chairman PBOS)