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| Table 7.18: CS 335 Software Engineering | | | | | | | |
| **Course Code** | | | | CS 335 | | **Total Credits:** | 12.0E |
| **Course Name** | | | | Software Engineering | | | |
| **Course Status** | | | | Core | | | |
| **Delivery Mode:** | | | | **Lecture Hrs/Wk** | **Tutorial/Seminar/ Self–study** | **Practical Hrs/Wk** | **Notional Hrs/Semester** |
| 3 | 4 | 1 | 120 |
| **Assessment Mode:** | | | | Course work: 40%, final exam: 60% | | | |
| **Prerequisites:** | | | | IS 264 and IS 236/IS 274 | | | |
| **Objective:** | | | | The course equips students with an understanding of software development that is focused on both the practical and theoretical aspects of the software engineering discipline necessary to produce high quality software. | | | |
| **Learning Outcomes:** | | | | At the end of the course, students should be able to:   1. Demonstrate an understanding of a wide variety of software engineering principles, process models and development methods. 2. Explain software project management processes and life cycle. 3. Develop an awareness of the special requirements for specific types of system such as safety critical systems. 4. Demonstrate an understanding of the practical problems in developing software system. 5. Acquire knowledge that enables them to construct software of high quality- software that is reliable, reasonably easy to understand, modify and maintain. | | | |
| **Course Contents:** | | | | | | | |
| Unit I:About software engineering: | | | | | | | |
|  | Trends and Challenges in software engineering, professional and ethical responsibilities, examples of code of ethics | | | | | | |
| Unit II:Configuration Management: | | | | | | | |
|  | Overview, Types of Software Maintenance, Software Maintenance activities, Source code control and management, Source code processing, Group work support, Versions and Variants, Revision control systems. | | | | | | |
| Unit III: Software project management: | | | | | | | |
|  | Software Project Management Processes and life cycle: Initiation, Planning Processes, Execution processes, Control processes, Close-up processes. Software acquisition, Software risk management, software quality management, Project metrics Management, Resource management, Cost estimation Management, Human Resources Management, Procurement Management. | | | | | | |
| Unit IV: Quality Assurance: | | | | | | | |
|  | what is quality? quality concepts, reliability, software quality assurance. Defect costs, Reliability, Standards, Process and Project metrics, Object orientation metrics. Etc | | | | | | |
| Unit V: Testing: | | | | | | | |
|  | The importance of testing, testing throughout the software lifecycle, testing strategies.Types of test, verification and validation, Black and White Box testing. Test analysis and generation | | | | | | |
| Unit VI: Software Development in the Real World: | | | | | | | |
|  | Examples from industry. | | | | | | |
| **Recommended Readings:** | | | | | | | |
|  | | 1. | Sommerville: Software Engineering (5th Edition). Addison-Wesley, Boston USA | | | | |
|  | | 2 | Roger S. Pressman, adapted by Darrel Ince (2000) Software Engineering A Practitioner's Approach European Adaptation (5th Edition), McGraw-Hill, ISBN 0 073655783 | | | | |
|  | | 3 | Bruegge & Dutoit: Object Oriented Software Engineering – Conquering Complex and Changing Systems, Prentice Hall, 2000, ISBN 0-13-017452-1 | | | | |
|  | | 4 | Schmuller: SAMS Teach Yourself UML in 24 Hours, Sams Publishing, ISBN 0-672-31636-6 | | | | |
|  | | 5 | Roger Pressman (2009), Software Engineering: A Practitioner’s Approach, McGraw-Hill Education; 7th edition | | | | |
| **Required Laboratory Equipment:** | | | | | | | |
|  | |  | Computers and CASE tools. | | | | |

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| Table 7.23: IS 236 Structured Systems Analysis and Design | | | | | | | | | |
| **Course Code** | | | | | IS 236 | | **Total Credits:** | | 8.0E |
| **Course Name** | | | | | Structured Systems Analysis and Design | | | | |
| **Delivery Mode:** | | | | | **Lecture**  **Hrs/Wk** | **Tutorial**  **Hrs/Wk** | | **Practical**  **Hrs/Wk** | **Total**  **Hrs/Wk** |
| **2** | **2** | | **1** | **80** |
| **Assessment Mode:** | | | | | Course Work 40%, Final 60% | | | | |
| **Prerequisite:** | | | | | None | | | | |
| **Objectives:** | | | | | The course introduces to the students structured systems analysis and design approaches and techniques. The course objective are to:   1. Develop an understanding of system analysis problem, scope and boundaries of the problem. 2. Outline the activities involved in the analysis and design phases of systems development using a structured approach. 3. Develop an understanding of the role of CASE tools in systems analysis and design. 4. Apply structured design techniques in system analysis and design. 5. Develop skills needed for system architectural design including the interactions and interfaces of the components to be designed. | | | | |
| **Learning Outcome:** | | | | | At the conclusion of the course, students should be able to:   1. Conduct a feasibility analysis including operational, technical and economic aspects for a given design problem. 2. Apply structured system analysis techniques such control flow, data flow for a complete design of a system. 3. Demonstrate an understanding of CASE tools in a design task. | | | | |
| **Course Contents:** | | | | | | | | | |
| Unit I: Introduction | | | | | | | | | |
|  | | Overview of structured systems analysis and design:  Motivation and Problems. | | | | | | | |
| Unit II: System Development Life-Cycle (SDLC) | | | | | | | | | |
|  | | Introduction to the SDLC. Review of historical models. The spiral model and interactive approaches, Prototyping and Incremental models, The Rational Unified Process. | | | | | | | |
| Unit III: Software Requirements | | | | | | | | | |
|  | | Importance of Requirements, User Requirements. System Requirements (functional and non-functional), Requirements Document Structure, Requirements Engineering- feasibility study, requirements elicitation,  Requirements Validation. | | | | | | | |
| Unit IV: Feasibility Analysis | | | | | | | | | |
|  | | Operational, Technical, Economic. | | | | | | | |
| Unit V: Structure System Analysis | | | | | | | | | |
|  | | Structured System Analysis: Process modelling with Data Flow Diagrams (DFDs), Logic modelling. | | | | | | | |
| Unit VI: Structured Design | | | | | | | | | |
|  | | Objectives of design - performance, control, changeability, Changeable systems, definition, module coupling - cohesiveness, cohesion, binding; structured design techniques-control flow diagramming, data flow diagramming, and dialogue diagramming. | | | | | | | |
| Unit VII: Top down design | | | | | | | | | |
|  | | Step-wise refinement; example problems (case studies). | | | | | | | |
| **Recommended Readings:** | | | | | | | | | |
|  |  | | |  | | | | | |
|  | 1. | | | Alan Dennis, Barbara Haley Wixom, Roberta M. Roth (2014), Systems Analysis and Design, 6th Edition, John Wiley & Sons. | | | | | |
|  | 2. | | | A. Dennis, B. Wixom and R. Roth (2006) Systems Analysis and Design, 3rd Edition, John Wiley & Sons, Inc., | | | | | |
|  | 3. | | | Jeffrey A. Hoffer, Joey George and Joe Valacich (2010).  Modern Systems Analysis and Design, 6th Edition. Prentice Hall. | | | | | |
|  | 4. | | | Rob Pooley, Jennifer Coady, Christoph Schneider and Henry Linger (2013). Information Systems Development: Reflections, Challenges and New Directions. New York: Springer Science. | | | | | |
|  | 5. | | | J. B. Dixit and Raj Kumar (2007). Structure Systems Analysis and Design. LAXMI Publication Ltd. | | | | | |
| **Required Laboratory Equipment:** | | | | | | | | | |
|  | | 1. | Computers with installed CASE tools. | | | | | | |

Table 7.41: IS 387 Environmental Management Information Systems

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| **Course Code:** | | | | IS 387 | | | **Total Credits:** | | 8.0 E |
| **Course Name:** | | | | Environmental Management Information Systems | | | | | |
| **Delivery Mode:** | | | | **Subject status** | **Lecture Hrs/Sem** | **Tutorial Hrs/Sem** | | **Practical Hrs/Sem** | **Total Hrs/Semester** |
| Elective | 15 | 30 | | 35 | 80 |
| **Assessment Mode:** | | | | Course Work: 40%, Final Exam: 60% | | | | | |
| **Prerequisites:** | | | | None | | | | | |
| **Subject aim/**  **Objective:** | | | | The objectives of this course are to:   1. Provides Skills to work with information and become quality consciousness for information 2. Provide knowledge of methods and techniques to supply business processes with information 3. Develop knowledge of models and methods for planning and controlling modern information processing 4. To determine information requirements for the corporate environmental management 5. Underscore the goal of sustainable development and the role of information and communication technology as an enabler of resource efficiency strategies, environmental and social awareness | | | | | |
| **Learning Outcomes:** | | | | At the end of the course, students should be able to:   1. Design holistic and consistent information system 2. Derive changes and risks from the evaluation of technologies 3. Understand forms of organization of corporate environmental protection 4. Explain the main implementation features of the environmental management principles in the sequences of procurement, production, logistics and marketing 5. Understand the elements of corporate environmental management systems and their implementation concepts 6. Master the principles of environment performance evaluation 7. Derive IT-strategies from corporate strategies 8. Define and implement IT supported projects of the corporate environmental protection | | | | | |
| **Course Contents:** | | | | | | | | | |
| Unit I: Information management | | | | | | | | | |
|  | | * Basics of the strategic and operative information management * Concepts of strategic information management * Establishing an operative information management * Decision making in information management * Techniques and tools of information management | | | | | | | |
| Unit II: Environmental management strategy | | | | | | | | | |
|  | | * Corporate environmental management systems * Strategies for environmental management * Implementation concepts of environmental management systems * Evaluation of environmental performance * Constraints of environmental policies and corporate strategies of environmental management * Organization of corporate environmental protection * Environmental oriented procurement, production, logistics and marketing | | | | | | | |
| Unit IV: Environmental controlling | | | | | | | | | |
|  | | * Basics of environmental controlling * Strategic and operative IT-controlling * Controlling instruments as environmental balances, environmental key figures, benchmarking | | | | | | | |
| Unit V: Corporate environmental information systems | | | | | | | | | |
|  | | * Definition of corporate environmental information systems * Reasons for implementing corporate environmental information systems * Requirements and functionalities of corporate environmental information systems * Architecture of corporate environmental information systems * Classification of corporate environmental information systems * Integration of corporate environmental information systems in the corporate information infrastructure * Evaluation of corporate environmental information systems | | | | | | | |
| **Assessment Methods, Rationale and Criteria:** | | | | | | | | | |
|  | | The course assessment will consist of formative assessments that include tests, quizzes, lab work and assignments as coursework and summative assessments that constitute a theoretical final examination. | | | | | | | |
| **Recommended Readings:** | | | | | | | | | |
|  | 1 | | Godwell Nhamo, Ekpe Inyang (2011), Framework and Tools for Environmental Management in Africa, CODESRIA. | | | | | | |
|  | 2 | | Teuteberg, F., Jorge Marx Gomez, (2010), Corporate Environmental Management Information Systems: Advancements and Trends, IGI Global | | | | | | |
|  | 3 | | John Darabaris (2008), Corporate Environmental Management, CRC Press | | | | | | |
|  | 4 | | Jorge Marx Gómez, Michael Sonnenschein, Martin Müller, Heinz Welsch, Claus Rautenstrauch (2007), Information Technologies in Environmental Engineering: Springer – Verlag Berlin Heidelberg. | | | | | | |
|  | 5 | | Pall M. Rikhardsson, Martin Bennett, Jan Jaap Bouma, Stefan Schaltegger(2005), Implementing Environmental Management Accounting: Status and Challenges | | | | | | |
| **Required Laboratory Equipment:** | | | | | | | | | |