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|  | **Daffodil International University****Department of Computer Science and Engineering (CSE)****Course Outline** |  |
| **Course Code:** | CSE325 |
| **Course Title:** | System Analysis and Design |
| **Program:** | B.Sc. in CSE |
| **Faculty:** | Faculty of Science and Information Technology (FSIT) |
| **Semester:** | Fall 2023 | **Year:** | 2022 |
| **Credit:** | 3.0 | **Contact Hour:** | 3.0 |
| **Course Level:** | Level 3 Term 2 | **Prerequisite:** | No |
| **Course Category:** | Core Engineering |
| **Instructor Name:** | Hasna Hena |
| **Designation:**  | Assistant Professor |
| **Email:** | hena.cse@diu.edu.bd  |

Course Content:

**Data and Information: Description of types of Information:** Tactical, Operational, Strategic, Statutory, Division of Management into different hierarchical levels, Type of Information needed at different levels of management, Division of organizations into several functional areas and their information requirements, Attributes of Information, System, Different Types of System, Verities of Computer Based Information System. **System Development Life Cycle (SDLC):** Nine Steps in designing Information Systems, Tasks performed in each step, Nature of tasks performed by Systems Analysts, The attributes of Systems Analysts, The tools used by Systems Analysts. **Information Gathering Strategy:** Various sources of information, Methods of searching for information, interviewing techniques to gather information from line managers to top management and Methods of consensus for formulating requirements. Interview Method of Data Collection in Research, Data Collection, Searching, example and practicing different methods used in Research.

**Data Flow Diagram (DFD):** What are Data Flow Diagrams (DFDs), why they are useful, how they are developed, How to level DFDs, Good style conventions in developing DFDs, Difference between Logical and Physical DFDs, Tools available to draw DFDs. **Process Specification:** Structured English, decision tables and decision trees. **Feasibility Analysis:** How to formulate the goals to be met by the information system to be designed, How to obtain alternative solutions to satisfy the goals, How to assess the feasibility of implementing alternative solutions, How to compute cost vs. benefits of each alternative feasible solution, How to prepare a system proposal for the potential users of the system. **Project Management:** Explain the process of managing an information systems project, List project management activities during project initiation, planning, execution, and closedown, Explain critical path scheduling, Gantt charts, and Network diagrams, Explain the utility of commercial project management software tools.

**Input and output Design Method:** Design functional input for users of business systems, Design engaging input displays for users of information systems, Design useful input forms for people interacting on the Web, Understand the objectives for effective output design, Relate output content to output methods inside and outside the organization, Design display output. **System Testing :** Failure, Fault/Bug, Error, System Testing, System Testing Process Steps, Types of System Testing, Rules of System Testing, Test case design, White Box testing, Black box testing and Factors that Determine System Quality . **Information Security and Cybercrime**: Computer Applications in the Society, Security Challenges and Vulnerabilities, Hackers and Computer Crime, Proof of Computer Crime, What are Cyber Crime, Technologies and Tools for Protecting Information Resources, Property Rights: Intellectual Property. **E-Commerce and Digital Marketing**: Describe the unique features of e-commerce, digital markets, and digital goods, Describe the various types of e-commerce and how e-commerce has changed consumer retailing and business-to-business transactions, Evaluate the role of m-commerce, digital markets, and digital goods and Compare the principal payment systems for electronic commerce. **Human Computer Interaction (HCI):** Understand human–computer interaction (HCI), Design a variety of user interfaces, Design effective dialog for HCI, and Understand the importance of user feedback, Articulate HCI implications for designing ecommerce Web sites. Formulate queries that permit users to search the Web. **Quality and Maintenance:** Understand the uses of effective coding to support users in accomplishing their tasks, Design effective and efficient data capture approaches for people and systems, Recognize how to ensure data quality through validation, Articulate accuracy advantages of user input on ecommerce Web sites.

Course Description/Rational:

The main goal of this course is to provide students with a solid background in information systems analysis and design techniques through a combination of theory and practice. It introduces the vital logical and design considerations addressed during system and application software development.

**Course Learning Outcome (CLO): (at the end of the course, student will be able to do :)**

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| CLO1 | Able to understand the concepts of a system and what it means to develop and implement an information system, and the system development life cycle. |
| CLO2 | Able to familiar with a variety of problem-solving tools and approaches for the design and analysis of information systems. |
| CLO3 | Able to organize and relate system requirements (functional and non-functional) and convert them into technical specifications. |
| CLO4 | Able to construct context and level-1 data flow diagrams |
| CLO5 | Able to create a user interface form data input and output, data to represent common business situations, working in a group which carried out a system development project with four phased deliverables: system proposal, requirements specifications, design specifications and a working prototype with emphasis on user interfaces. |

**Content of the course:**

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| **SL** | **Course Content (as summary)** | **Hrs** | **CLO’s** |
| 1. | Distinction between Data and Information, Description of types of Information: Tactical, Operational, Strategic, Statutory, Division of Management into different hierarchical levels, Type of Information needed at different levels of management, Division of organizations into several functional areas and their information requirements, Attributes of Information, System, Different Types of System, Verities of Computer Based Information System | 3:0 | CLO1 |
| 2. | Nine Steps in designing Information Systems, Tasks performed in each step, Nature of tasks performed by Systems Analysts, The attributes of Systems Analysts, The tools used by Systems Analysts. | 3:0 | CLO1 |
| 3. | Strategy to gather information for computerization, Various sources of information, Methods of searching for information, Interviewing techniques to gather information from line managers to top management and Methods of consensus for formulating requirements. | 3:0 | CLO2 |
| 4. | Interview Method of Data Collection in Research, Data Collection, Searching, example and practicing different methods used in Research.  | 3:0 | CLO2 |
| 5. | What are Data Flow Diagrams (DFDs), Why they are useful, How are they developed, How to level DFDs, Good style conventions in developing DFDs, Difference between Logical and Physical DFDs, Tools available to draw DFDs | 3:0 | CLO4 |
| 6. | Practice Example DFD0, DFD1, and DFD1 from real life example.  | 3:0 | CLO4 |
| 7. | How to use structured English to precisely specify processes, The terminology used in structured English, Terminology of decision tables and how it is used to specify complex logic, How to detect errors in decision table specifications, Terminology and use of decision trees, Comparison of structured English, decision tables and decision trees | 3:0 | CLO4 |
| 8. | Practice Example on Decision Tree, Decision Table and Structured Language.  | 3:0 | CLO4 |
| 9. | How to formulate the goals to be met by the information system to be designed, How to obtain alternative solutions to satisfy the goals, How to assess the feasibility of implementing alternative solutions, How to compute cost vs. benefits of each alternative feasible solution, How to prepare a system proposal for the potential users of the system. | 3:0 | CLO2 |
| 10.  | Explain the process of managing an information systems project, Describe the skills required to be an effective project manager, List project management activities during project initiation, planning, execution, and closedown, Explain critical path scheduling, Gantt charts, and Network diagrams, Explain the utility of commercial project management software tools. | 3:0 | CLO2 |
| 11. | Design functional input forms for users of business systems, Design engaging input displays for users of information systems, Design useful input forms for people interacting on the Web, Understand the objectives for effective output design, Relate output content to output methods inside and outside the organization, Design display output | 3:0 | CLO5 |
| 12. | Failure, Fault/Bug, Error, System Testing, System Testing Process Steps, Types of System Testing, Rules of System Testing, Test case design, White Box testing, Black box testing and Factors that Determine System Quality  | 3:0 | CLO2 |
| 13. | Computer Applications in the Society, Security Challenges and Vulnerabilities, Hackers and Computer Crime, Proof of Computer Crime, What are Cyber Crime, Technologies and Tools for Protecting Information Resources, Property Rights: Intellectual Property | 3:0 | CLO2 |
| 14. | Describe the unique features of e-commerce, digital markets, and digital goods, Describe the various types of e-commerce and how e-commerce has changed consumer retailing and business-to-business transactions, Evaluate the role of m-commerce, digital markets, and digital goods and Compare the principal payment systems for electronic commerce. | 3:0 | CLO2 |
| 15. | Understand human–computer interaction (HCI), Design a variety of user interfaces, Design effective dialog for HCI, and Understand the importance of user feedback, Articulate HCI implications for designing ecommerce Web sites. Formulate queries that permit users to search the Web. | 3:0 | CLO3 |
| 16. | Understand the uses of effective coding to support users in accomplishing their tasks, Design effective and efficient data capture approaches for people and systems, Recognize how to ensure data quality through validation, Articulate accuracy advantages of user input on ecommerce Web sites. | 3:0 | CLO3 |

**Mapping of Course Learning Outcomes to Program Learning Outcomes [attainment level used for**

**CLO’s from 1(weak)-3(strong) correlation]**

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| **PLO’s CLO’s** | **PLO1** | **PLO2** | **PLO3** | **PLO4** | **PLO5** | **PLO6** | **PLO7** | **PLO8** | **PLO9** | **PLO10** | **PLO11** | **PLO12** |
| **CLO1** | 3 |  |  |  |  |  |  |  |  |  |  |  |
| **CLO2** |  | 3 |  |  |  |  |  |  |  |  |  |  |
| **CLO3** |  |  | 3 |  |  |  |  |  |  |  |  |  |
| **CLO4** |  |  |  |  | 3 |  |  |  |  |  |  |  |
| **CLO5** |  |  |  | 3 |  |  |  |  |  |  |  |  |

**Mapping Course Learning Outcome (CLOs) with the Teaching-Learning and Assessment Strategy:**

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| **CLO’s** | **Teaching Learning Strategy** | **Assessment Strategy** | **Corresponding****PO number** | **Domain****Level/Learning****Taxonomy** |
| CLO1 | TLA1 | Quiz/Assignment | PLO1 | L1 |
| CLO2 | TLA2 | Midterm/Quiz | PLO2 | L2 |
| CLO3 | TLA3 | Midterm/Final/Quiz | PLO3 | L3 |
| CLO4 | TLA4 | Final/Quiz/Presentation | PLO4, OLO5 | L3, L4 |
| CLO5 | TLA5 | Midterm/Final/Quiz | PLO4, PLO5 | L3, L4 |

**Course Delivery Plan/Lesson Delivery Plan:**

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| **Week/Lesson****(hour)** | **Discussion Topic and Book Reference** | **Student Activities during Online and Onsite and TLA** | **Mapping with CLO and PLO** | **Assessment Plan** |
| Week 1Lesson 1 & 2[3 Hours]  | Lesson 1: Data and Information, Types of Information, Need for an Information System, Qualities of Information.Lesson2: System concept and Definition, Characteristics, Attributes, Elements of a system, Types of System.Book Reference: Elias M. Awad(Ch-3) (Page 60-83) | Lesson 1, 2: Online/ Onsite discussion; Review Feedback online; Using Interactive content e.g.Voice over PPT, PPT, Video, H5P; TLA1, TLA2 | CLO1 |  |
| Week 2Lesson 3 & 4[3 Hours] | Lesson 3: Nine steps involved in analysis and design. Role of a system analyst, attributes.Lesson 4: Tools used by system analyst. Book Reference: Elias M. Awad(Ch-2) (Page 40-57) | Lesson 3, 4: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA2 | CLO2, CLO3 |  |
| Week 3Lesson 5 & 6[3 Hours] | Lesson 5: Introduction to Information gathering, Information gathering tools, Information gathering strategies.Lesson 6: Used and apply Information gathering tools.Book Reference: Elias M. Awad(Ch-5) (Page 126-150)Kendall and Kendall(Ch-4) | Lesson 5, 6: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA2, TLA3 | CLO1, CLO2, CLO3 | Class Test# 1 (Either online or onsite based on Wk1-Wk2discussion) based on  |
| Week 4Lesson 7 & 8[3 Hours]  | Lesson 7: Flow oriented model, Data Flow Diagram (DFD) and why DFD, DFD notations, DFD levels and layers, Physical and logical DFD.Lesson 8: Practicing and applying tools available to draw DFDs.Book Reference: Elias M. Awad(Ch-9) (Page 261-283)Kendall and Kendall(Ch-7) | Lesson 7, 8: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA2, TLA3 | CLO2, CLO3 | Assignment 1 (will be due by Wk3)- Based on real life Information systems. |
| Week 5Lesson 9 & 10[3 Hours]  | Lesson 9 & 10: Practicing and applying tools available to draw DFDs.Book Reference: Elias M. Awad(Ch-9) (Page 261-283)Kendall and Kendall(Ch-7) | Lesson 9 & 10: Online/Onsite discussion; Review Feedback online; Using Interactive content e.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA2, TLA3 | CLO2, CLO3 |  |
| Week 6Lesson 11 & 12[3 Hours] | Lesson 11: Project Specification, Definition, Structured English Language, Decision Tree, and Decision Table.Lesson 12: Practicing and applying tools to convert the technical tools from specifications.Book Reference: Kendall and Kendall(Ch-9) (Page 259-273) | Lesson 11 & 12: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA2, TLA3 | CLO2, CLO3 |  |
| Week 7Lesson 13 & 14[3 Hours] | Lesson 13: Project Specification, Definition, Structured English Language, Decision Tree, and Decision Table.Lesson 14: Practicing and applying tools to convert the technical tools from specifications.Book Reference: Kendall and Kendall(Ch-9) (Page 259-273) | Lesson 13, 14: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA2, TLA3 | CLO2, CLO3 |  |
| Week 8Lesson 15 & 16[3 Hours] | Lesson 15: Feasibility Analysis – Steps in feasibility analysis, Evaluating alternative solution, Cost and benefit calculation and analysis, System proposal structure.Lesson 16: Practicing and applying tools to convert the find the deficiency, goal, sub goals, and find the cost and benefits from scenario.Book Reference: Elias M. Awad(Ch- 7,8)(Page 196-254) | Lesson 15, 16: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA3 | CLO2, CLO3 | **Class Test-2**Class Test# 2 (Either online or onsite based on Wk3-Wk4discussion) based on  |
| **Week 9** |  **Midterm**  |
| Week 10Lesson 17 & 18[3 Hours] | Lesson 17: Input Design, Output Design, File and database design, System architecture, Systems maintenance.Lesson 18: Appreciate system architecture of Input, output and database design practicing.Book Reference: Elias M. Awad(Ch- 10)Kendall and Kendall(Ch-11,12,13) | Lesson 17, 18: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA3 | CLO1, CLO3 |  |
| Week 11Lesson 19 & 20[3 Hours] | Lesson 19: Systems Testing, Failure, Bug and Error, Testing, Types of system testing, Software testing life cycle, Rules for System Testing, Stages of System Testing, Dynamic System Testing, Objectives of Quality Assurance.Lesson 20: Testing and validation of manual testing and using tools for real life application both web and mobile.Book Reference: Elias M. Awad(Ch-12) | Lesson 19, 20: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA4 | CLO1, CLO4 |  |
| Week 12Lesson 21 & 22[3 Hours] | Lesson 21: Managing the Information System Projects, Importance of Project Management, System Service Request (SSR).Lesson 22: Managing Information System Project, Representation and Scheduling project plans: critical path scheduling, Gantt charts, and Network diagrams.Book Reference: Elias M. Awad(Ch-15) | Lesson 21, 22: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA3 | CLO1, CLO4 | Assignment 2 (will be due by Wk12) |
| Week 13Lesson 23 & 24[3 Hours] | Lesson 23: Information Security And Cybercrime, Security Challenges and Vulnerabilities of Information System, Computer and Cybercrime, Information Security and Control, Safe and Ethical Uses of Computer.Lesson 24: Find out the challenges and know how to break the challenges.Book Reference: Elias M. Awad(Ch-16) | Lesson 23, 24: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA4 | CO4, CO5 | Course Presentation |
| Week 14Lesson 25 & 26[3 Hours] | Lesson 25: E-commerce: Digital Marketing and Digital Goods, Electronic Commerce and the Internet, The Growth of E-Commerce, Eight unique features of E-Commerce technology, The Benefits of Disintermediation to the Consumer.Lesson 26: Types of Electronic Commerce, Types of electronic payment systems.Book Reference: Pearson /PrenticeHall (Ch-10) | Lesson 25, 26: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA1, TLA4 | CLO4, CLO5 | Class Test# 3 (Either online or onsite based on Wk8-Wk10discussion) based on  |
| Week 15Lesson 27 & 28[3 Hours] | Lesson 27: Systems Analysis and Design Research: Past, Present and Future.Lesson 28: Research on Modern Systems Analysis and Design Technologies and Applications.Book Reference: Handout | Lesson 27, 28: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA3 | CLO5 |  |
| Week 16Lesson 29 & 30[3 Hours] | Lesson 29: Understand human–computer interaction (HCI), Design a variety of user interfaces, Design effective dialog for HCI, and Understand the importance of user feedback, Articulate HCI implications for designing ecommerce Web sites. Formulate queries that permit users to search the Web.Lesson 30: Research on Modern Systems Analysis and Design Technologies and Applications.Book Reference: Kendall and Kendall(Ch-14) (Page 441-454) | Lesson 29, 30: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA3 | CLO5 |  |
| Week 17Lesson 31 & 32[3 Hours] | Lesson 31: Understand the uses of effective coding to support users in accomplishing their tasks, Design effective and efficient data capture approaches for people and systems, Recognize how to ensure data quality through validation, Articulate accuracy advantages of user input on ecommerce Web sites.Lesson 32: Research on Modern Systems Analysis and Design Technologies and Applications.Book Reference: Kendall and Kendall(Ch-15) (Page 485-555) | Lesson 31, 32: Online/Onsite discussion; Review Feedback online; Using Interactive contente.g. Voice over PPT, PPT, Video, H5P; TLA3 |  |  |
| Week 18 | **Final Exam** |

**Assessment Pattern:**

**CIE – Breakup (Theory) [60 marks]**

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| **Bloom’s Criteria** | **Attendance(07)** | **Class Test(15)** | **Assignment(05)** | **Presentation(08)** | **Mid Exam(25)** |
| Remember |  |  |  |  |  |
| Understand |  | 05 | 02 | 02 | 05 |
| Apply |  | 03 |  | 03 | 05 |
| Analyze |  | 03 | 03 |  | 05 |
| Evaluate |  |  |  |  |  |
| Create |  | 04 |  | 03 | 05 |

**SEE – Semester End Examination [40 marks] {Theory}**

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| **Bloom Criteria** | **Score for the Test** |
| Remember | 00 |
| Understand | 05 |
| Apply | 15 |
| Analyze | 05 |
| Evaluate | 05 |
| Create | 10 |

Text Books

* 1. System Analysis and Design, by Elias M. Awad
	2. Systems Analysis and Design, Kendall and Kendall, Fifth Edition

Reference Books:

1. Management Information Systems: Managing the Digital Firm (11th edition), Pearson/Prentice Hall.
2. Software Engineering, Pressman, Current Edition.
3. Systems Analysis and Design Methods, Jeffrey Whitten, Lonnie Bentley.