Title (Units): **COMP3007 Systems Analysis and Design (3,3,0)**

Course Aims: To learn some methodological approaches to the development of properly designed and documented information systems. The object-oriented approach will be covered. To let students know how to develop information systems for their COMP 3008-9 IS Development Project.

Prerequisite: COMP2026 Problem Solving Using Object Oriented Programming

Course Intended Learning Outcomes (CILOs):
Upon successful completion of this course, students should be able to:

No.	Course Intended Learning Outcomes (CILOs)
	Knowledge
1	Describe the fundamental elements of a system development cycle, data modeling and object-oriented analysis and design approach.
2	Explain models for object-oriented systems development with UML and user interface design principles.
	Professional Skill
3	Create use case diagram to represent the scope of development problem domain
4	Develop domain model, sequence diagram, activity diagram and statechart diagram based on use case narrative
5	Apply Unified Modeling Language Notation to object-oriented models
6	Perform data modeling

Calendar Description: In this course, students will learn some methodological approaches to the development of properly designed and documented information systems. The object oriented approach will be covered. This course is incorporated with COMP 3008-9 IS Development Project to let students practice the development of information systems.

Teaching and Learning Activities (TLAs):

CILOs	Type of TLA
1-6	Students will attend lectures for fundamental elements of a system development cycle, data and process analysis, modeling and design. Students will also learn the object-oriented systems development with UML and user interface design principles for system development.
3,4,5,6	Students will complete assignments which require them to create object-oriented models using UML, and perform data modeling.

Assessment:

No.	Assessment Methods	Weighting	CILOs to be addressed	Description of Assessment Tasks
1	Continuous Assessment	30%	1-6	Continuous assessments are designed to measure how well students have learned the concepts of system development such as object-oriented approach and the creation of object-oriented models.
2	Examination	70%	1-6	Final examination questions are designed to determine to what extent the students have achieved the expected learning outcomes. Examination questions will focus on evaluating students' ability to apply the object-oriented analysis and design approach to different domains.

Assessment Rubrics:

	Excellent (A)	Good (B)	Satisfactory (C)	Marginal Pass (D)	Fail (F)
System Development Life Cycle	• Evidence of good understanding of all phases of a development cycle	• Evidence of fair understanding of a development cycle	• Evidence of reasonable understanding of a development cycle	• Poor understanding of a development cycle	• No understanding of a development cycle
Data Modeling	• Strong evidence of effective application of modeling tools such as ERD to perform data modeling	• Good evidence of effective application of modeling tools such as ERD to perform data modeling	• Moderate evidence of effective application of modeling tools such as ERD to perform data modeling	• Little evidence of effective application of modeling tools such as ERD to perform data modeling	• No evidence of effective application of modeling tools such as ERD to perform data modeling
Object Oriented Concepts	• Show thorough understanding of object oriented concepts	• Show good understanding of object oriented concepts	• Show sufficient understanding of object oriented concepts	• Show limited understanding of object oriented concepts	• Show little or no understanding of object oriented concepts
Unified Modeling Language (UML)	• Demonstrate thorough understanding and mastering of unified modeling language	• Demonstrate good understanding and mastering of unified modeling language	• Demonstrate sufficient understanding and mastering of unified modeling language	• Demonstrate limited understanding and mastering of unified modeling language	• Demonstrate little or no understanding and mastering of unified modeling language
Object Oriented Modeling	• Demonstrate thorough understanding of object oriented models • Able to construct object oriented models without error	• Demonstrate good understanding of object oriented models • Able to construct object oriented models with minor errors	• Demonstrate sufficient understanding of object oriented models • Able to construct some object oriented models with a few major errors	• Demonstrate limited understanding of object oriented models • Able to construct a few object oriented models with many major errors	• Demonstrate little or no understanding of object oriented models • Not able to construct acceptable object oriented models
User Interface Design	• Show thorough understanding of basic UI design principles and techniques	• Show good understanding of basic UI design principles and techniques	• Show sufficient understanding of basic UI design principles and techniques	• Show limited understanding of basic UI design principles and techniques	• Show little or no understanding of basic UI design principles and techniques

Course Content and CILOs Mapping:

Content	CILO No.

I	The Information System Development Cycle	1
II	Data Modeling	6
III	Object-oriented (OO) Concepts	2
IV	Introduction to Unified Modeling language (UML) notation	2,3,4,5
V	Modeling for Systems Analysis and design	2,3,4,5,6
VI	Introduction to User Interface Design	2

References:

- A. Dennis, B.H. Wixom and D. Tegarden, System Analysis and Design: An Object-Oriented Approach with UML (5th Edition), Wiley, 2015.
- N. Ashrafi and H. Ashrafi, Object Oriented Systems Aanlysis and Design, Pearson, 2014.
- J. L. Whitten, L. D. Bentley and K. C. Dittman, Systems Analysis and Design for the Global Enterprise (7th Editon), McGraw-Hill, 2007.
- J.W. Satzinger, R.B. Jackson and S.D. Burd, Introduction to Systems and Design: An Agile Iterative Approach (6th Edition), Course Technology, 2012.
- R.V. Stumpf and L.C. Teague, Object-Oriented Systems Analysis and design with UML, Prentice Hall, 2005.
- J.F. George, D. Batra, J.S. Valacich and J.A. Hoffer, Object-Oriented Systems Analysis and Design (second edition), Prentice Hall, 2006.
- S. Bennett, S. McRobb and R. Farmer, Object-Oriented Systems Analysis and design using UML, (4th Edition), McGraw-Hill, 2010.

Course Content:

Topic

I. The Information System Development Cycle
   - A. Phases of traditional development cycle
   - B. The stakeholders
   - C. Waterfall approach
   - D. Iterative and incremental approach
   - E. Rational unified process

II. Data Modeling
   - A. Modeling tool (e.g. ERD)
   - B. Normalization

III. Object-oriented (OO) Concepts
   - A. Classes and objects
   - B. Modularity
   - C. Encapsulation
   - D. Generalization
   - E. Polymorphism
   - F. Association

IV. Introduction to Unified Modeling language (UML) notation

V. Modeling for Systems Analysis and design
   - A. Use-case modeling (actors, use cases, use case diagram)
   - B. Domain modeling (class, relationship, inheritance, generalization)
   - C. Activity modeling (activity diagram)
   - D. Behavior modeling (sequence / collaboration diagram)
   - E. State change modeling (statechart diagram)

VI. Introduction to User Interface Design