DOCUMENT:	**SYLLABUS**	COURSE CODE:	**CPSOFT30/1L**	COPIES ISSUED TO:
EFFECTIVITY:	**AY 2023 – 2024**	COURSE TITLE:	**SOFTWARE DESIGN (with Lab)**	**College of Engineering Learning Resource Center Faculty**

VISION

We are National University, a dynamic private institution committed to nation-building, recognized internationally in education and research.

MISSION

Guided by the core values and characterized by our cultural heritage of Dynamic Filipinism, National University is committed to providing relevant, innovative, and accessible quality education and other development programs.

We are committed to our:

STUDENTS, by molding them into life-long learners, ethical and spiritual citizens, and self-directed agents of change.

FACULTY and EMPLOYEES, by enhancing their competencies, stimulating their passions, cultivating their commitment, and providing a just and fulfilling work environment.

ALUMNI, by strengthening their sense of pride through engagement, loyalty, and love for their alma mater.

INDUSTRY PARTNERS and EMPLOYERS, through active collaborations, providing them Nationalians who will contribute to their growth and development.

COMMUNITY, by contributing to the improvement of life's conditions and well-being of its members.

CORE VALUES

1. Integrity   2. Compassion   3. Innovation   4. Resilience   5. Patriotism

GRADUATE ATTRIBUTES INTENDED FOR NATIONALIANS (GAINs)	INSTITUTIONAL LEARNING OUTCOMES (ILO)
1. Leadership and Teamwork	a. Exhibit moral, ethical, and competent leadership.
	b. Collaborate effectively in teams of different cultures.
2. Responsible Citizenship	c. Participate actively in community-oriented advocacies that contribute to nation-building.
3. Innovative, Creative, and Critical Thinking	d. Develop an entrepreneurial mindset.
	e. Provide solutions to challenges in various fields of specialization and society in general.
4. Academic and Professional Competence	f. Demonstrate mastery of foundational skills and specific areas of specialization.
5. Effective Communication	g. Express ideas meaningfully, accurately, and appropriately in multicultural and multidisciplinary contexts.
6. Whole Person Character	h. Practice NU Core Values in personal and professional life.
7. Life and Career Skills Orientation	i. Engage in continuing personal and professional development.
	j. Exemplify the capacity for self-reflection.
	k. Demonstrate adaptability, flexibility, productivity, and accountability in diverse settings.
8. Technological Literacy	l. Exhibit mastery in navigating various technological tools and techniques.

Program Educational Objectives (PEO)

After 3 to 5 years on the job, graduates of NU College of Engineering are expected to:	a	b	c	d	e	f	g	h	i	j	k	l
1. demonstrate engineering knowledge by providing solutions to technological problems;					✓	✓						✓
2. demonstrate entrepreneurial skills in engineering related ventures;				✓	✓							
3. demonstrate ethical commitment to the community and the profession;	✓		✓					✓		✓	✓	
4. contribute to knowledge and best engineering practice through research and development; and		✓		✓	✓	✓	✓					✓
5. engage in life-long learning as demonstrated through career achievements.	✓								✓	✓		

(ILO column headers above PEO table)

Program Outcomes (PO)

At the time of graduation, the student must be able to:	1	2	3	4	5
a. apply knowledge of mathematics, natural science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems;	✓				
b. design and conduct experiments as well as analyze and interpret data;	✓			✓	
c. design system, component or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability, in accordance with standards;	✓			✓	

(PEO column headers above PO table)

d. function on multidisciplinary teams;		✓	✓	
e. identify, formulate, and solve complex engineering problems;	✓	✓		✓
f. understand professional and ethical responsibility;			✓	
g.1.communicate effectively (written);		✓		✓
g.2.communicate effectively (oral);		✓		✓
h. have a broad education necessary to understand the impact of engineering solutions in a global, economic, environmental, and societal context.;	✓		✓	
i. recognize the need for, and an ability to engage in life-long learning.;				✓
j. have knowledge of contemporary issues;			✓	✓
k. create, select and apply appropriate techniques, resources, skills, and modern engineering and IT tools, including prediction and modelling, to complex engineering problems, with an understanding of the limitation;	✓		✓	
l. have knowledge and understanding of engineering and management principles as a member and leader in a team, to manage projects and in multidisciplinary environments; and	✓		✓	
m. understand and apply one specialized field in engineering	✓			

COURSE DESCRIPTION

Software Design is a CpE professional course that involves specifying, designing, and development of reliable systems software using object-oriented programming languages. Students are expected to demonstrate competence in developing applications which integrate feasibility study, system analysis, object-oriented design, implementation, and testing programming that supports the demand of the industry.

PRE-REQUISITE(S)

CPDSAA2L Data Structures and Algorithms (with Lab)

COURSE OUTCOMES (CO)

At the end of the course, the student must be able to:	Program Outcomes (PO)												
	a	b	c	d	e	f	g	h	i	j	k	l	m
1. Understand the importance of software design.			✓										
2. Apply structures analysis tools in understanding software requirements analysis.			✓										
3. Examine cost benefit analysis and feasibility study to ensure software quality.			✓										
4. Design an develop an application in computing using the different paradigms of system development.			✓										

CREDIT

3 Lecture-unit

1 Laboratory-unit

TIME ALLOTMENT

4-hour lecture per week

4-hour laboratory per week

COURSE REQUIREMENTS

1. Major Exams

2. Projects
3. Performance assessments
4. Laboratory activities

CLASS POLICIES

1. Students must observe and practice the National University core values.
2. During synchronous classes, students are expected to observe proper etiquette and decorum.
3. Attendance is a must. Students must inform the instructor of absence and tardiness. Giving of equivalent assessment is under the discretion of the instructor.
4. Students are expected to practice academic honesty and avoid committing plagiarism by submitting original contents in all written and oral assessments. Any student who violates the policy on academic honesty will automatically receive a grade of 0.0. These include cheating, excessive absences and others as agreed in the course.
5. Students must always come prepared to class and are required to bring all necessary materials.
6. Students are expected to be aware of the assessment schedule as specified in the latter part of this document.
7. Students are encouraged to do advanced reading and submission of assessments.

GRADING SYSTEM

[Breakdown the grade components for the final grade computation]

A. Midterm Period

Performance Assessment	20%
Laboratory Activity	20%
Midterm Exam	40%
Pre-final Progress report	20%

B. Final Period

Performance Assessment	20%
Laboratory Activity	20%
Midterm Exam	20%
Project	40%

Final Grade = 50%MP + 50%FP

Note: *Passing grade is 60% on a base-0 Grading System*

Grade Equivalent

Grade Range (%)	Grade Point
96 – 100	4.0
90 – 95	3.5
84 – 89	3.0
78 – 83	2.5
72 – 77	2.0
66 – 71	1.5
60 – 65	1.0
59 and below	R

COURSE CONTENTS / COURSE OUTLINE

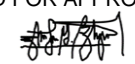| WEEK	COURSE OUTCOMES	TOPIC OUTCOMES	TOPICS	METHODOLOGY	RESOURCES	ASSESSMENT
1		Understand the course, modules, pedagogy, grading and class policy.	Introduction to Software Design. Project Requirement Discussion	Class Discussion Reading Assignment	Course Syllabus	
2	CLO 1, 2	• Name the basic components and aim of software engineering. • Understand the concepts of software processes and software process models. • Introduce the three generic software process models and when they might be used.	Preliminaries of Software Design and Engineering • Professional Software Development • Software Engineering Diversity • Software Engineering and the Web • Software Engineering Ethics • Goals and terminology of Software Engineering • Activities and Principles of Software Engineering	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
3	CLO 1, 2	• Describe the importance of software architecture and processes on architectural design. • Know about the fundamental process activities of software requirements engineering, software development, testing, and evolution.	Software Processes • SDLC • Software Activities	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
4-5	CLO 1, 2	• Introduce issues that must be considered in the specification and design of secure software.	Software Process Model • Waterfall • Iterative • Prototyping • Spiral • Agile	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
6	CLO 1, 2	• Introduce the idea of architecture patterns, the ways of organizing system architectures, which cannot be reused in system design.	Security Engineering Dependability and Security Assurance	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report

WEEK	COURSE OUTCOMES	TOPIC OUTCOMES	TOPICS	METHODOLOGY	RESOURCES	ASSESSMENT
7			MIDTERM WEEK			
8	CLO 3, 4	• Know the architectural patterns that are often used in different types of application system, including transaction processing systems and language processing systems.	Component-based and Service-oriented Architecture • Component Models • CBSE Processes • Services as reusable components • Service Engineering	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
9-10	CLO 3, 4	• Know the key issues that have to be considered when designing and implementing distributed software systems. • Introduce the commonly used patterns for distributed systems architectures and know the types of system for which each architecture is most applicable.	Distributed Software Engineering • Distributed System Issues • Model of Interaction • Client-Server Computing Architectural Patterns of Distributed Systems • Master-slave architectures • Two-tier client-server • Distributed Component Architectures • Software-as-a-Service (SaaS)	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
11	CLO 3, 4	• Understand the factors that influence personal motivation and what these might mean for software project managers.	Software Management • Project Management • Risk Management • Managing People • Teamwork	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
12	CLO 3, 4	• Understand the fundamentals of software costing and reasons why the price of the software may not be directly related to its development cost.	Project Planning • Software Pricing • Project Scheduling • Agile Planning • Estimation Techniques	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report
13	CLO 3, 4	• Know the essential functionality that must be provided by a	Quality Management • Software Quality • Software Standards	Class Discussion Reading Assignment Hands-on Laboratory Activity	References	Performance Assessment Laboratory Report

WEEK	COURSE OUTCOMES	TOPIC OUTCOMES	TOPICS	METHODOLOGY	RESOURCES	ASSESSMENT
		version management system and the relationships between version management and system building.	• Software Measurements not Metrics Configuration Management • Version Management • Change Management • System Building • Release Management			
13.5	**FINALS WEEK**					

RESOURCES

Textbooks

[1] Sommerville, Ian (2016). Software Engineering 10th Ed. Pearson Education USA.

[2] Braude, Eric (2014). Software Engineering: Modern Approaches 2nd Ed. Waveland Press Inc. USA.

[3] Suryn, Witold (2014). Software Quality Engineering: A Practitioner's Approach. John Wiley and Sons USA.

[4] Pressman, Roger (2015). Software Engineering: A Practioner's Approach. McGraw-Hill Education USA.

[5] Aiello, Bob (2016). Agile Application Lifecycle Management: Using DevOps to Drive Process Improvement. Addison-Wesley USA.

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