UNIVERSITY OF WOLLONGONG IN DUBAI

Undergraduate Program Subject Outline

School of Engineering

SUBJECT NAME: ENGINEERING COMPUTING AND ANALYSIS

Course code:	ENGG100	Section:	Dubai
Credit Points:	6	Year	2024
Session	Spring	Duration:	11 weeks
Pre-requisite(s)	None	Co-requisite(s)	None
Mode of Delivery:	On-Campus		
Class Tests Passing Requirement:	Weighted average of the three class tests $\geq 40\%$		

Timetabling Information can be found at MY|UOWD, https://my.uowdubai.ac.ae/
(Lecture: 2 Hours, Tutorial: 2 Hours, Computer Lab: 2 Hours)

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Consultation:	See Moodle		

1 SUBJECT DESCRIPTION

This subject combines a focus on engineering dynamics with utilisation of common computing tools used throughout the degree program. Students will develop a logical approach to deconstruct engineering problems to create algorithms that solve real-world problems. Computing tools and methods will be used to analyse and predict the behaviour of particles under different external forces.

2 CONTRIBUTION TO PROGRAM LEARNING OUTCOMES (PLO)

The activities in this course contribute to achieving the following program learning outcomes:

Program: Engineering	
PLO1	Demonstrate professional knowledge with a strong grounding in engineering and awareness of current local and international trends and challenges.
PLO2	Navigate disciplinary literature with particular skills in gathering & synthesising information independently to support an argument or strategy.
PLO3	Implement common research methods in the field of engineering, analyse data & evaluate the validity of findings and exercise critical judgement in determining new directions and strategies for carrying out further investigation.
PLO4	Draw from established engineering concepts, methods and industry standards to develop innovative solutions to complex engineering problems by completing a research project relating to the respective engineering major.
PLO5	Communicate clearly and coherently in writing to a range of audiences, with an ability to integrate knowledge, research, data, analysis and critical evaluation.
PLO6	Communicate verbally to a range of audiences using appropriate language in presentations, consultation and negotiation.
PLO7	Work productively as part of a team with the capacity for leadership, recognising the roles, responsibilities and accountabilities of team members.
PLO8	Show respect for the views, values and culture of others in settings involving colleagues, clients, communities and end users, and consider alternate perspectives in design and project management.
PLO9	Make complex considerations in regards to professional ethics and accountability, account for and mitigate risk, and operate with a commitment to professionalism in all work.
PLO10	Appreciate the importance of sustainable engineering design, and seek to maximise positive social and environmental outcomes in engineering design, practice and development.

	Course ENGG100 Upon successful completion of this subject, a student should be able to:	**PLOs**
LO1	Collect, manage and analyse data using computing tools.	1,7
LO2	Analyse forces acting on particles and their resultant motion	1
LO3	Create MATLAB algorithms to solve real-world problems	1,3
LO4	Design, implement, test and debug simple MATLAB script	1,3
LO5	Apply logical engineering approach to multi-faceted problems involving engineering mechanics and computing.	1
LO6	Demonstrate ability to independently solve basic engineering problems using MATLAB	1
LO7	Present in professional format the outcome of project and laboratory work	3
LO8	Conduct a design, code and test project in a team setting	1,4

3 SUBJECT SCHEDULE

3.1 LECTURE SCHEDULE

Week	Lecture Topic(s)	Learning Outcomes	Session Type	Related Supporting Materials	Assessment Formative (F) Summative (S)
1	Introduction to MATLAB script design	4	Lecture	Chapter 1, from Daniel T. Valentine & Brian D. Hahn

Chapter 2 and Chapter 4, from Daniel T. Valentine & Brian D. Hahn | |
| | Introduction to the Course & MATLAB | | Tutorial & Lab | | |
| 2 | Analyse rectilinear motion particles | 2, 4 | Lecture | Chapter 12, from Tim McCarthy | |
| | Analyse rectilinear motion particles (tutorial)

Design and implement simple MATLAB scripts (Lab) | | Tutorial & Lab | | |
| 3 | Analyze curvilinear motion of particles using n-t coordinate and projectile motion | 2, 3 | Lecture | Chapter 12, from Tim McCarthy | Project Announcement |
| | Analyze curvilinear motion of particles using n-t coordinate and projectile motion (Tutorial)

MATLAB script to solve real world problems (Lab) | 3, 4 | Tutorial & Lab | | |
| 4 | MATLAB scripts using structure approach | 1, 4 | Lecture | | Class Test 1 (Dynamics) (20%) 75 minutes Exam assess the students in Dynamics (S) |
| | Tutorial: Class Test 1

Lab: MATLAB Script to solve engineering problems | 3, 4 | Tutorial & Lab | | |
| 5 | MATLAB script to analyze Mechanics Problem, Plotting | | Lecture | Chapter 7, from Daniel T. Valentine & Brian D. Hahn

Chapter 2 and Chapter 4, from Daniel T. Valentine & Brian D. Hahn | |
	MATLAB script using Structure Approach		Tutorial & Lab		
6	Project Discussion	5, 6	Lecture	Chapter 7, from Daniel T. Valentine & Brian D. Hahn	
	MATLAB script to analyze Problems, Plotting		Tutorial & Lab		

Week					
7	MATLAB Script to collect manage and analyze data in a graphical manner	1, 2, 4, 5	Lecture	Chapter 14, from Daniel T. Valentine & Brian D. Hahn	Class Test 2: (MATLAB Script using structure approach and analyze problem and plotting) Worth 20% (S)
	Tutorial: Class Test 2 LAB: MATLAB Script to collect manage and analyze data in a graphical manner	1, 2, 3, 5, 6, 7, 8	Tutorial & Lab		
8	BASIC MATLAB Algorithm: Searching Algorithm	1, 4, 7	Lecture	Chapter 3, Chapter 5, and Chapter 6, from Daniel T. Valentine & Brian D. Hahn Chapter 14, from Daniel T. Valentine & Brian D. Hahn	
	MATLAB Script to collect, manage, and analyze data in a graphical manner	1, 4, 5, 6, 7, 8	Tutorial & Lab		
9	BASIC MATLAB Algorithm: Searching Algorithm	1, 2, 3, 4, 5, 6, 7, 8	Lecture	Chapter 3, Chapter 5, and Chapter 6, from Daniel T. Valentine & Brian D. Hahn	
	Multidimensional Array, structure, normal and tangential curvilinear motion	5, 6, 7, 8	Tutorial & Lab		
10	Workshop and Project	1, 3, 4	Lecture		Class Test 3 20%. MATLAB Script, Data analysis graphically, Array. (S)
	LAB: Multidimensional Array, structure, normal and tangential curvilinear motion	1, 3, 4	Tutorial & Lab		
11	Project		Lecture		Project Submission (S)
			Tutorial & Lab		

3.2 COMPUTER LABS SCHEDULE

Week	Computer Lab Activities	Learning Outcome(s)
1	No lab	1,3,4,6,7
2	Design and implement MATLAB basics – Lab 1	
3	MATLAB mathematical functions – Lab 2	
4	MATLAB conditional programming to solve engineering problems – Lab 3	
5	MATLAB interactive inputs – Lab 4	
6	MATLAB script to analyze mechanics problem – Lab 5	
7	MATLAB script to collect, manage and analyze data, external files – Lab 6	
8	MATLAB GUI – Lab 7	
9	MATLAB GUI - Lab 8	

4 SUPPORTING MATERIALS

Books, Articles, Videos, Podcasts, etc. will be available on our Learning Management System (LMS).

4.1 REQUIRED TEXTBOOK

- Daniel T. Valentine & Brian D. Hahn, Essential MATLAB for Engineers and Scientists, 8th edition, Academic Press/Elsevier, 2022. ISBN: 9780323995481
- Tim McCarthy, Fundamentals of engineering mechanics for ENGG102 and ENGG100, Melbourne, Victoria: Pearson Australia, 2015. ISBN: 9781488610431.

4.2 RECOMMENDED READINGS

- Sandeep Nagar, Introduction to MATLAB for Engineers and Scientists: Solutions for Numerical Computation and Modeling, United States: Apress, 2017. ISBN: 9781484231890.
- Eugeniy Mikhailov, Programming with MATLAB for Scientists: A Beginner's Introduction. United Kingdom: CRC Press, 2018. ISBN: 9781498738293.
- Ogbonnaya I. Okoro, The Essential MATLAB & Simulink for Engineers and Scientists. South Africa: Juta, Limited, 2009. ISBN: 9780702177644.

4.3 ACCESS TO SUPPORTING MATERIALS

The University uses MOODLE as a Learning Management System (LMS) to support all coursework subjects. The subject site and supporting materials can be accessed via: https://moodle.uowplatform.edu.au And via UOWD Library.

5 ASSESSMENT

5.1 ASSESSMENT TASKS

Learning Outcome	Assessment 1 **Laboratories** **20%**	Assessment 2 **Project** **20%**	Assessment 3 **Class Tests** **60%**
LO 1	✓	✓	
LO 2		✓	✓
LO 3	✓	✓	✓
LO 4	✓	✓	✓
LO 5		✓	✓
LO 6	✓	✓	✓
LO 7	✓	✓	
LO 8		✓	
Group (G)/ Individual (I)	I	G	I
Total Marks	20	20	60
Due Date	Weekly	Week 11	Weeks 4, 7, and 10

5.2 ASSESSMENT DETAILS

Assessment Task:	Laboratories

OUTLINE AND REQUIREMENTS

Mini class tests will be completed during the lab to assess students for the course learning outcomes.

MARKING CRITERIA

Students will be marked according to effort and completeness in executing and demonstrating their answers. Explicit step-by-step solutions are expected to confirm accuracy, methodology, solution, results, and ability to interpretation of these results to the lab instructor.

Assessment Task:	Project

OUTLINE AND REQUIREMENTS

The project is completed as group work with no more than three students per group. During week 4, the groups will be formed along with the project title and requirements. 33% of the project marks will be assigned during the tutorial sessions using mini-tests assigned by the tutorial instructor.

MARKING CRITERIA

The assessment of the marking criteria will be based on a contributions sheet that evaluates each member's input to the group project.

Assessment Task:	Class Tests

OUTLINE AND REQUIREMENTS

Class tests are to be carried out in weeks 4, 7, & 10 during the tutorial sessions. These tests are closed-book assessments and are completed individually. Write-on test involving problem-solving, short answer type questions, and calculations.

MARKING CRITERIA

The class tests are marked based on the correctness and completeness of answering the questions.

LATE SUBMISSIONS:

Please note that late submissions will incur a penalty of 20% per day, including weekends.

5.3 GRADES AWARDED

The approved grades of performance and associated ranges of marks for undergraduate subjects
are:

High Distinction (HD)	85 – 100%
Distinction (D)	75 – 84%
Credit (C)	65 – 74%
Pass (P)	50 – 64%
Pass Supplementary (PS)	50%
Fail (F)	0 – 49% (and not meeting the attendance requirements)
Technical Fail (TF)	Not meeting the final exam passing requirements – see the Assessment Policy PP-REG-DB-2.1

5.4 SATISFACTORY COMPLETION REQUIREMENTS

In order to be considered for a grade of Pass (P) or better in this subject, students **must achieve the minimum required mark in the Final Examination (see page 1 for required score);** students who obtain a composite mark greater than or equal to 50% but do not satisfy the Final Examination minimum pass requirements in the final examination will be awarded a "Technical Fail" grade.

Students must 'reasonably' complete all assessment tasks (including the required score for the Final Examination,) and submit these as specified in the subject outline. 'Reasonable' completion of an assessment task will be determined based on the instructions given to the student including: word length, demonstration of research and analysis where required, adherence to the Plagiarism Policy guidelines, and completion of each section/component of the assessment. Failure to submit all assessment tasks may result in a Fail grade awarded for the subject.

6 RELEVANT POLICIES AND DOCUMENTS

All students must read and be familiar with the following UOWD policies and documents, which are available on the Student Online Resources (my.uowdubai.ac.ae) website by following the Policies link:
- Academic Grievance Policy
- Academic Integrity Policy
- Campus Access and Order Rules
- Code of Conduct – Library Users
- Code of Practice – Students
- Copyright Policy
- Intellectual Property Policy
- Library Regulations
- Minimum Rate of Progress
- Music, Video and Software Piracy
- Non-Discriminatory Language and Practice & Presentation Policy and Guidelines
- Special Consideration Policy & Procedure
- Student Attendance Policy
- Student Conduct Rules
- Rules for use of UOWD ITTS Facilities
- Teaching and Assessment: Code of Practice – Teaching
- Teaching and Assessment: Assessment and Feedback Policy
- Teaching and Assessment: Subject Delivery Policy

7 SSP & STUDIOSITY

SSP (Student Support Program) is a program committed to assisting students in developing their academic skills and getting the most out of their studies. As part of their services, SSP provides Peer Tutoring Program and Academic Workshops (https://my.uowdubai.ac.ae/ssd/index.php).

Studiosity is an online study tool that students can access 24 hours, 7 days a week! Students can receive feedback on submitted writing in less than 24 hours and receive one-to-one, personal help in real time with a subject specialist. The service can be accessed through the subject's Moodle site.

For further information, please contact:
SSP Coordinator
ssp@uowdubai.ac.ae
Phone Number: +971 4 278 1756

8 ACADEMIC INTEGRITY

Plagiarism and cheating are serious offences that can lead to expulsion from the university. Students must be familiar with the *Academic Integrity* policy which outlines the procedure that will be followed in case of academic misconduct including cheating and plagiarism. Please refer to *How to Avoid Plagiarism* available on the Student Online Resources website (http://my.uowdubai.ac.ae).

8.1 TURNITIN

Students are required to submit all written assignments in soft copy through the TurnItIn system which is available online at www.turnitin.com. Every student must have a TurnItIn account. Failure to submit an assignment through TurnItIn will result in marks for that assignment being withheld. **Students do NOT need to hand in a printed copy of the TurnItIn Originality Report.** More information about TurnItIn (including how to create an account and add a class) will be provided in the first lecture. Students can download Frequently Asked Questions (FAQs) about TurnItIn from the SSP section of UOWD website (https://www.uowdubai.ac.ae/academic-resources/student-support-programs).

TurnItIn information required to add this subject:

Class ID:	Moodle Link
Password:	Moodle Link

8.2 REFERENCE & IN-TEXT CITATION

For information about referencing and in-text citation please review the *Academic Writing Presentation* available on the Student Online Resources website (http://my.uowdubai.ac.ae).

8.3 UOWD RULES & POLICIES

For information about UOWD Rules and Policies, please go to the Student Online Resources website (http://my.uowdubai.ac.ae) and click on the POLICIES link.

9 ATTENDANCE REQUIREMENTS

Attendance in this subject is compulsory. Failure to attend all tutorials and computer labs as per the Student Attendance Policy may result in a FAIL grade. Students are strongly encouraged to become familiar with this policy (which can be found on the Online Resources website at my.uowdubai.ac.ae).

10 TUTORIAL/COMPUTER LAB ENROLMENTS

All students must sign up for one tutorial and/or computer lab in Week 1. Admission to a tutorial/computer lab will not be possible unless the student's name is on the Attendance List for that class. No changes will be allowed once a student has enrolled in a tutorial/computer lab.

11 SUPPLEMENTARY ASSESSMENTS

A supplementary assessment may be offered to students whose performance in this subject is close (45-49 in the final examination and 48-49 in the composite score) to that required to pass the subject, and are otherwise identified as meriting an offer of a supplementary assessment. The precise form of a supplementary assessment will be determined at the time the offer of a supplementary is made.

12 LECTURE CAPTURE

UOWD supports the recording of lectures as a supplemental study tool, to provide students with equity of access, and as a technology-enriched learning strategy to enhance the student experience.

To make your own recording of a lecture you **must** receive the explicit permission of the Educator and those people who are also being recorded.

You may only use recorded lectures, whether they are your own or recorded by the university, for your own educational purposes. Recordings cannot be altered, shared or published on another platform, without permission of the University. UOWD's Lecture Capture policy is underdevelopment.

13 SUSTAINABILITY

UOWD encourages all students to act in a sustainable manner when planning and submitting assessments. If possible, students should not use plastic items, such as folders, covers, and bindings, and other synthetic materials, for presentations, workshops, and other activities. Students are also encouraged to avoid unnecessary printing; and if printing is required, please consider printing double-sided and only printing essential illustrations avoiding blocks of any colour as the use of ink is harmful to the environment. Always behave in a sustainable way.