•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Northumbria University Programme Framework for Northumbria Awards - Module Specification

Faculty	Engineering and Environment	**Department**		BEng (Hons) Mechanical Engineering (Manufacturing Systems and Design)	**Subject**		**Module Tutor**		Nak-Kyun Cho		
Module Title	CAD						**Module Code**		MSDE 220		
Module Type* *(see key below)*	Choose an item.										
Module size credits	**Level 3:**		**Level 4:**	**10**	**Level 5:**		**Level 6:**		**Level 7:**		
Home programme/s for which the module is designed				BEng (Hons) Mechanical Engineering (Manufacturing Systems and Design)			**Code/s**				
Additional Programme/s other than that/those for which the module for specifically designed							**Code/s**				
Delivery Pattern (Please tick)		**Semester based** *(please specify)*		Sem 1 ☒ Sem 2 ☐	**Year Long**	☐	**Full-time** **Part-time** **Distance Learning**		☒ ☐ ☐		
Location(s) of delivery: If delivered at EPWO partners please give partner name and location											

KEY:

APL	*Accreditation for prior learning*	*P/F*	*Pass/fail module*	*PLIN*	*Placement - Industrial*
CORE	*PNVQ core skills module*	*P/F_DS*	*Pass/fail dissertation module*	*PRAC*	*Practical*
DISS	*Dissertation*	*P/F_PJ*	*Pass/fail project module*	*PROJ*	*Project*
FLDW	*Fieldwork*	*P/F_PL*	*Pass/fail placement module*	*STAN*	*Standard module*
INDS	*Independent study*	*PLAY*	*Placement – academic study abroad FT*	*WKBS*	*Work base study*
MAFOUN	*MA foundation modules - ASS*	*PLCL*	*Placement – Clinical*	*WORK*	*Workshop*

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Module Overview (Max 250 words per section) (This section is aimed at providing a prospective or current student with a brief overview of the module in answer to the specific questions and will form an element of the module handbook)

What will I learn on this module? (SRS 0001) Please give a brief indication of the content of the module including the main topic / subject areas studied
This module is designed to develop those skills identified by employers as being necessary for effective technical communication and performance at work. This module provides students with the basic knowledge of computer graphics for engineers. Students will learn basic theories of computer graphics such as coordinate transformations, viewing transformations, etc. and practice them with a popular commercial CAD software, SolidWorks.
How will I learn on this module? (SRS 0002) Please provide a brief overview the learning and teaching approaches the student can expect to experience.
This module will be delivered through regular lectures and computer exercise. During these lectures, students will obtain practical skills to make use of a commercial 3D-CAD software in designing mechanical components and their assembly. Active learning sessions will be used to present you with new material and assist you in exploring fundamental concepts and topics within the module. Sessions will involve a combination of content delivery and practical learning exercises to enable you to apply your learning to well-defined, authentic management problems. Learning activities will enable students to work collaboratively through the development of teamwork and communication skills, and the encouragement of creative thinking to solve problems issued from project management.
How will I be supported academically on this module? (SRS 0003) Please provide a brief overview of the academic support available to students, including any support that may be accessed outside formal scheduled teaching.
During your active learning sessions, academic support will be available to facilitate your exploration of the problem-solving activities. Formative feedback will be provided by the module team, including answering student queries and providing guidance concerning the module such as assessments and your academic progress. The electronic learning platform (e-class) provides a comprehensive resource for integrated learning incorporating learning materials and reading lists that will facilitate directed and self-directed learning. Contact with academic tutors and your peers outside formal teaching hours is encouraged through dedicated 'office hours', discussion boards, and messaging systems within the e-class.
What will I be expected to read on this module? (SRS 0004) All modules at Seoul Tech include a range of reading materials that students are expected to engage with. The reading list for this module can be found from MSDE Module Descriptor – https://msde.seoultech.ac.kr/curriculum_/syllabus_/

Northumbria University Library Reading List Service (please confirm the following)	**Please give date added**
A draft reading list has been created and on the university Library Reading List Service	Click here to enter a date.
Reading material has been acquired and digitised (following approval)	Click here to enter a date.
Reading list has been published to students (for module delivery)	Click here to enter a date.

NB – for PFNA alignment process only, module authors should complete either the University Library e-Reading List, or Appendix 1.

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Module Learning Outcomes (MLOs) *(Max of five in total*, for standard 20-credit modules)*

**this can increase to a maximum of 10, for modules with more than 20 credits*

What will I be expected to achieve? (SRS 0005)	**How will I be assessed?** (SRS 0006) *Please give details of all formative and summative assessment process indicating which MLOs will be addressed and how feedback will be provided.*	**Programme (Level) Learning Outcomes that this module contributes to:** *[Please insert PLO number as listed on the programme specification]*
• C3: Select and apply appropriate computational and analytical techniques to model complex problems, recognising the limitations of the techniques employed • C4: Select and evaluate technical literature and other sources of information to address complex problems • C6: Apply an integrated or systems approach to the solution of complex problems • C17: Communicate effectively on complex engineering matters with technical and non-technical audiences	**Formative Assessment** Academic staff on the module will assess you in a formative manner to help build your confidence and highlight any misunderstandings you may have of the theoretical and professional concepts presented in the module. Your formative feedback will be given to you either verbally by academic staff on the module during formally scheduled teaching sessions. Your formative feedback aims to help you learn and prepare for the submission of your summative assessment. **Summative Assessment** Academic staff on the module will assess you in a summative manner by three pieces of assessment: Component 1. Computer exercises are conducted to assess 3D modelling skills by interpreting 2D engineering drawings into 3D models using CAD software (C17). Component 2, The final group project assesses your 3D modelling skills, your ability to apply tolerance to engineering design, your proficiency in evaluating the basic structural	**Knowledge & Understanding:** • KU1: Demonstrate basic knowledge of the scientific and mathematical foundations of engineering to solve basic problems. • KU2. Perform simple analysis of familiar engineering systems. • KU3. Identify and utilise basic methodologies to create solutions to specific engineering problems. **Intellectual / Professional skills & abilities:** • IPSA1. Demonstrate the use of fundamental approaches to solving readily defined engineering problems. • IPSA2. Communicate established engineering concepts to expert and non-expert audiences using standard formats and media. • IPSA4. Illustrate solutions to basic engineering problems. **Personal Values Attributes** (Global / Cultural awareness, Ethics, Curiosity) (PVA): • PVA2. Demonstrate creativity in discussing solutions to standard problems.

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

	integrity of designed components, and the extent of discussion regarding the 3D model and the resulting prototype produced by a 3D printer (C3, C4, C6)	

Pre-requisite(s) (SRS 0007) Any module which must already have been taken, or any stipulated level of prior knowledge required in order to study this module, (co-requisite core models need not be listed	Statics
Co-requisite(s) (SRS 0008) Modules at this level which must be taken with this module	Mechanics of Material

Module abstract (SRS 0009)

Please provide a brief a brief abstract of the module (150 words max). This section acts as the 'shop window' for the module, therefore it needs to engage and inspire the student. This is the first thing that the student will read about this module, so it must immediately grab their attention. The main aim is to encourage the student to read on, however the summary should be written in such a way that if the student reads nothing else this section will convey all key messages and benefits that the module will offer. Start by explaining the module title where necessary. Then highlight any selling points relating to the four pillars: Research-Rich Learning; Technology Enhanced Learning; Assessment and Feedback; Employability and Entrepreneurship. Examples may include student satisfaction rates, learning environment, state-of-the-art facilities etc. Finally indicate benefits of the module such as the key skills that the students will gain for future employment and career paths that are open to them.
In this module, students will utilize the commercial 3D CAD software SolidWorks for the design of engineering components. The primary focus will be on practical exercises related to fundamental functions, including solid modelling, surface modelling, assembly modelling, and 2D drawing drafting. Furthermore, students will apply the acquired skills through modelling exercises based on real-world engineering problems and will also learn features related to 3D printing integration. They will manufacture a prototype using a 3D printer.

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Programme Framework for Northumbria Awards Research Rich Learning Design Pillar (SRS 0090)

Embedding Research Rich Learning into the curriculum: Indicate how students will be actively engaged in research rich learning in this module through: research/enquiry based learning, research tutored learning, research led learning and/or research oriented learning, providing a brief overview of how this / these will feature within the delivery of the module (250 words max) **Note:** • **Research/enquiry Based:** L&T Based on student-centred enquiry and research activities (conducting research). • **Research Tutored**: L&T Emphasises learning focused on students actively discussing research, and critically engaging with research outputs • **Research Led**: T&L structured around subject content and that content is based on the research (learning about research) • **Research Orientated:** T&L Emphasises understanding of the knowledge production process, and methods of enquiry in the subject (learning how to research)
You will have the opportunity to practice modelling engineering problems and communicating with engineers/peers graphically. This will help you develop a deeper understanding of key knowledge and methodologies. Additionally, this module will introduce you to research methodologies and their application in mechanical engineering. The module will enable you to effectively carry out engineering analysis modules such as the Capstone Project and Individual Project. This involves defining engineering problems and obtaining numerical analysis solutions that can be compared with theoretical analysis results. In the third year of your studies, the ability to model engineering problems using 3D CAD will become a core skill, essential for completing a variety of coursework and team projects offered in mechanics and design-related modules.

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Notional Student Workload (NSW) for each mode of delivery

Complete for each delivery mode where the distribution of NSW **Full Time Mode of Delivery**				**Part Time Mode of Delivery**			
Activity type	**Hours**	KIS category	KIS category hours		**Hours**	KIS category	KIS category hours
Lecture	30	Scheduled	76	Lecture		Scheduled	
Seminar				Seminar			
Tutorial	30			Tutorial			
Project Supervision	16			Project Supervision			
Demonstration				Demonstration			
Practical classes and workshops				Practical classes and workshops			
Supervised time in studio/ workshop				Supervised time in studio/ workshop			
Fieldwork				Fieldwork			
External visits				External visits			
Tutor guided independent learning		Independent	24	Tutor guided independent learning		Independent	
Student independent learning	24			Student independent learning			
Placement		Placement		Placement		Placement	
Study abroad				Study abroad			
Work based learning				Work based learning			
Total workload *200 hours for 20 credit module*	*100*		*100*	**Total workload**			

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Summative Assessment

Sequence *001, 002 etc.*	**Activity type** *indicate **ONE** of the following types:*	**Brief description of assessment (max.120 characters)** *e.g. type/ length of exam, type/ word limit of coursework*	**Weighting** % or Pass/Fail (for grade only components) *Note: % weightings should add up to 100% for module overall*	**Final assessment**		**Anonymous submission**		**ESAF submission**	
				Yes	*No*	*Yes*	*No*	*Yes*	*No*
001	CW (Coursework)	Individual Computer Exercise (60mins)	50%	☐	☒	☐	☒	☐	☐
002	PRE (Presentation)	Group Project (5wks) Report + Presentation	50%	☒	☐	☐	☒	☐	☐
003				☐	☐	☐	☐	☐	☐
004	Choose an item.			☐	☐	☐	☐	☐	☐
005	Choose an item.			☐	☐	☐	☐	☐	☐
006	Choose an item.			☐	☐	☐	☐	☐	☐
007	Choose an item.			☐	☐	☐	☐	☐	☐
008	Choose an item.			☐	☐	☐	☐	☐	☐
009	Choose an item.			☐	☐	☐	☐	☐	☐
010	Choose an item.			☐	☐	☐	☐	☐	☐
011	Choose an item.			☐	☐	☐	☐	☐	☐
012	Choose an item.			☐	☐	☐	☐	☐	☐

Reassessment (specify either synoptic or non-synoptic)

Synoptic reassessment *One form of reassessment that tests all module learning outcomes*	Yes	☒	No	☐
Non-synoptic reassessment *Where module referred overall, individual failed components of assessment are reassessed*	Yes	☐	No	☒

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

FOR OFFICE USE ONLY

Date of FPARSC Approval Click here to enter a date.

Date of entry onto SITS	Click here to enter a date.

LOG OF CHANGES POST-APPROVAL

Please indicate any changes to the approved module descriptor from 2012/13 onwards

Section No.	**Brief description of change**	**Date of Approval**	**Semester and year of first implementation**
		Click here to enter a date.	
		Click here to enter a date.	
		Click here to enter a date.	
		Click here to enter a date.	
		Click here to enter a date.	
		Click here to enter a date.	
		Click here to enter a date.	
		Click here to enter a date.	

•MLO1. Apply knowledge and understanding of scientific principles and methodology related to solving w

Appendix 1

Indicative Reading for PFNA alignment approval only *(to be completed only if e-reading list unavailable at point of alignment approval)*

N.B. This outline indicative reading list will be utilised for approval purposes only, and **a full e-reading list must be produced and available by the June of the academic year prior to the first delivery date of the module** (at which point the section of p.2 referring to University Library Reading Lists should be completed).

Please list below essential key text underpinning the module content and ultimately the learning outcomes:

1) Shigley's Mechanical Engineering Design, Richard G. Budynas and J. Keith Nisbett, 11th Edition, 2021
2) Machine Design An Integrated Approach, Robert Norton, Prentice Hall, 2008