



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	Hyuk Dong KWON			
Module Title	Engineering Economics and IPR					Module Code	MSDE 463			
Module Type* (see key below)	Choose an item.									
Module size credits	Level 3:		Level 4:		Level 5:		Level 6:	10	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 <input checked="" type="checkbox"/> Sem 2 <input type="checkbox"/>	Year Long		<input type="checkbox"/>	Full-time Part-time Distance Learning		<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	
Location(s) of delivery: If delivered at EPWO partners please give partner name and location							Mugung Hall (Seoultech)			

***KEY:**

APL Accreditation for prior learning
CORE PNVQ core skills module
DISS Dissertation
FLDW Fieldwork
INDS Independent study
MAFOUN MA foundation modules - ASS

P/F Pass/fail module
P/F_DS Pass/fail dissertation module
P/F_PJ Pass/fail project module
P/F_PL Pass/fail placement module
PLAY Placement – academic study abroad FT
PLCL Placement – Clinical

PLIN Placement - Industrial
PRAC Practical
PROJ Project
STAN Standard module
WKBS Work base study
WORK Workshop

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 aims to provide the student with an introduction to economics for engineering project, and intellectual property right. This covers basics of economic analysis from an engineering perspective, dealing with the principles and methods for analysing the economic feasibility of alternatives and for making selection decisions among them. Concepts, filing processes and search methods on intellectual properties such as patent, utility model, design and trademark is delivered for better protection of IPRs, and use in research and development process.	
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 is delivered by regular lectures, and during the lectures, students will have opportunities to understand the cost, benefit, project management and intellectual property issues. In the regular tests, they practice their learning of theory by solving the actual engineering economic problems. Through a short project, students have chance to investigate and analyse the actual prospective on patents.	
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. Lecture materials will be provided to students in advance and they can have a chance to study in advance before the class. Contact with academic tutors and your peers outside formal teaching hours is encouraged through dedicated 'office hours', discussion boards and e-mails. Professional support staff provide the first point of contact for a range of queries, including, for example, those concerning assessment submission, late submission/extensions, and other administrative issues.	
What will I be expected to read on this module? (SRS 0004) All modules at Northumbria include a range of reading materials that students are expected to engage with. The reading list for this module can be found at: http://readinglists.northumbria.ac.uk (Reading List service online guide for academic staff, this contains contact details for the Reading List team – http://library.northumbria.ac.uk/readinglists)	
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.

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*

<p><u>What will I be expected to achieve?</u> (SRS 0005)</p> <ul style="list-style-type: none"> • C2: Analyse complex problems to reach substantiated conclusions using first principles of mathematics, statistics, natural science and engineering principles • C6: Apply an integrated or systems approach to the solution of complex problems • C7: Evaluate the environmental and societal impact of solutions to complex problems and minimise adverse impacts • C12: Use practical laboratory and workshop skills to investigate complex problems 	<p><u>How will I be assessed?</u> (SRS 0006) <i>Please give details of all formative and summative assessment process indicating which MLOs will be addressed and how feedback will be provided.</i></p> <p>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.</p> <p>Summative Assessment Academic staff on the module will assess you in a summative manner by two pieces of assessment:</p> <p>Component 1, two written examinations, is to assess your knowledge and understanding mechanical vibration and the solution of complex problems through analytical techniques (C2 & C6).</p> <p>Component 2, presentation, is used to evaluate your ability to apply creativity and curiosity to analyse well-defined mechanical vibrational problems reaching substantiated</p>	<p><u>Programme (Level) Learning Outcomes that this module contributes to:</u> <i>[Please insert PLO number as listed on the programme specification]</i></p> <p>Knowledge & Understanding:</p> <ul style="list-style-type: none"> • KU1: Evaluate and apply complex knowledge of the scientific and mathematical principles of engineering to solve Real-World problems. • KU2: Perform advanced analysis of unfamiliar engineering systems. <p>Intellectual / Professional skills & abilities:</p> <ul style="list-style-type: none"> • IPSA1. Apply advanced approaches to solving unfamiliar real world mechanical engineering problems. • IPSA5. Demonstrate the ability to solve advanced design problems and apply advanced manufacturing systems <p>Personal Values Attributes (Global / Cultural awareness, Ethics, Curiosity) (PVA):</p> <ul style="list-style-type: none"> • PVA2. Critically analyse advanced solutions to complex engineering problems.
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	conclusions meeting module learning outcomes C7 & C12. Feedback will be provided by returning marked results with comments.	
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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)	None
Co-requisite(s) (SRS 0008) Modules at this level which must be taken with this module	N/A

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.

The module aims to provide students with the necessary understandings and mathematical skills to solve engineering economic problems for various application fields. Students will also understand how to evaluate and estimate economics for engineering projects and intellectual property rights.

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)



In this module, research tutored and research led learning will be demonstrated by economic evaluation and analysis of engineering projects. Students apply relevant knowledge to the design, analysis and fabrication process of product in the capstone design topics.



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	40	Scheduled	50	Lecture		Scheduled	
Seminar	5			Seminar			
Tutorial				Tutorial			
Project Supervision				Project Supervision			
Demonstration				Demonstration			
Practical classes and workshops	5			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	50	Tutor guided independent learning		Independent	
Student independent learning	50			Student independent learning			
Placement		Placement		Placement		Placement	
Study abroad				Study abroad			
Work based learning				Work based learning			
Total workload <i>200 hours for 20 credit module</i>	<i>100</i>		<i>100</i>	Total workload			



Summative Assessment

Sequence 001, 002 etc.	Activity type <i>indicate ONE of the following types:</i>	Brief description of assessment (max.120 characters) <i>e.g. type/ length of exam, type/ word limit of coursework</i>	Weighting % or Pass/Fail (for grade only components) <i>Note: % weightings should add up to 100% for module overall</i>	Final assessment		Anonymous submission		ESAF submission	
				Yes	No	Yes	No	Yes	No
001	PRE (Presentation)	Short Project	30%	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
002	EXAM (Written examination)	Final Exam (120 min)	70%	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
004	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
004	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
005	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
006	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
007	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
008	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
009	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
010	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
011	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
012	Choose an item.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Reassessment (specify either synoptic or non-synoptic)

Synoptic reassessment <i>One form of reassessment that tests all module learning outcomes</i>	Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
Non-synoptic reassessment <i>Where module referred overall, individual failed components of assessment are reassessed</i>	Yes	<input type="checkbox"/>	No	<input checked="" type="checkbox"/>

FOR OFFICE USE ONLY

Date of FPARSC Approval

Date of entry onto SITS	Click here to enter a date.
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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.	
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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) Chan S. Park, *Fundamentals of Engineering Economics*, 2nd ed. Prentice Hall, 2008
- 2) Chan S. Park, *Contemporary Engineering Economics*, 4th ed. Pearson Education Korea, 2007
- 3) L.T. Blank and A.J. Tarquin, *Engineering Economy*, 7th ed. McGraw Hill, 2012