THE HONG KONG POLYTECHNIC UNIVERSITY
香港理工大學

DEPARTMENT OF INDUSTRIAL AND SYSTEMS ENGINEERING

BACHELOR OF ENGINEERING (HONOURS) SCHEME IN PRODUCT AND INDUSTRIAL ENGINEERING

JUPAS Code: JS3557 / Scheme Code : 45498

Leading to the awards of
BEng (Hons) in Product Engineering with Marketing
Programme Code: 45498-PEM
BEng (Hons) in Industrial and Systems Engineering
Programme Code: 45498-ISE

PROGRAMME REQUIREMENT DOCUMENT

(For 2024/25 cohort)

September 2024

CONTENTS

CONTENTS (Continued)

CONTENTS (Continued)

CONTENTS (Continued)

SECTION

SECTION 1 - GENERAL INFORMATION

Programme Title	BEng (Hons) Scheme in Product and Industrial Engineering	
Award Title	BEng (Hons) in Product Engineering with Marketing (PEM)	BEng (Hons) in Industrial and Systems Engineering (ISE)
Mode of Study	Full-time	
Normal Duration	Normal Year 1 intake Full-time Mode: 4 Years Senior Year intake Full-time Mode: 2 Years	
Total Credit Requirements for Graduation	Normal Year 1 intake: Normally 124 Academic Credits* + 10 IC Training Credits Senior Year intake: Normally 64 Academic Credits* + 6 IC Training Credits *exact number of credits depends on the academic background of students	
Medium of Instruction	The programme is delivered in English version	
Host Department	Department of Industrial and Systems Engineering (ISE)	
Contributing Departments	AF, AMA, AP, CLC, EEE, ELC, FENG, MM, IC	AF, AMA, AP, CLC, EEE, ELC, FENG, IC
Professional Recognition	The programme has been granted full accreditation by the Hong Kong Institution of Engineers (HKIE).	

This Programme Requirement Document is subject to review and changes which the Department can decide to make from time to time. Students will be informed of the changes as and when appropriate.

SECTION 2 - OVERALL PROGRAMME AIMS AND INTENDED LEARNING OUTCOMES

2.1 UNIVERSITY MISSION

The design of this programme begins with the Mission Statement of the University stated below.

1. To pursue impactful research that benefits the world.
2. To nurture critical thinkers, effective communicators, innovative problem solvers and socially responsible global citizens.
3. To foster a University community in which all members can excel in their aspirations with a strong sense of belonging and pride.

2.2 RATIONALE AND PROGRAMME AIMS

Rationale and Aims of PEM award

Product Engineering is concerned with the studies of product conception and specifications, technical design, design for product lifecycle, prototyping, materials and manufacturing processes, mould and die design, process design, quality assurance as well as outsourcing and their implications to a new product to be developed in terms of time-to-market, cost, environmental friendliness and quality. Marketing is concerned with attracting new customers by promising superior value and keeping and growing current customers by delivering satisfaction. The PEM award provides students with integrated education at honours degree level to enable them to develop into competent professionals in new product development. On completion of the PEM award, students are expected to:

1. have knowledge and understanding needed to perform duties of product development, in particular, the areas of product engineering and marketing;

2. demonstrate the ability to identify and solve product engineering problems both as individuals and as members of teams;

3. have been exposed to a range of academic activities of such style and content as will enable them to develop effective communication skills (oral, written, graphical and numerate);

4. have an awareness of professional ethics and social responsibilities to the community at large;

5. have been exposed to a range of activities that will enable them to seek, learn and apply information that is pertinent to the work they are undertaking.

Rationale and Aims of ISE award

Industrial and Systems Engineering concerns the design, improvement, and installation of integrated systems of people, materials, information, equipment, energy, and environment. This enables better understanding of the complex problems of modern industrial and business operations, draws on specialized knowledge and skills in the mathematical, physical, and social sciences together with the principles and methods of engineering analysis and design to specify, predict, and evaluate the results to be obtained from such systems.

This programme provides students with integrated education at honours degree level to enable them to develop into competent professional engineers in the industrial and systems engineering discipline. On completion of this programme, students are expected to:

1. be versed in the activities that persons employed in the various engineering disciplines may be called upon to fulfill in the execution of their duties (through the first year), and particularly, in the area of industrial and systems engineering (through the latter years of the programme);
2. have the knowledge and understanding needed to identify and solve industrial and systems engineering problems both as individuals and as members of teams;
3. have been exposed to a range of academic activities of such style and content as will enable them to develop effective communication skills (oral, written, graphical and numerical);
4. have an awareness of the responsibilities and ethics of professional engineers in the modern world, and be able to recognise the constraints imposed on the enterprise by economic and environmental factors;
5. have been exposed to a range of activities that will enable them to seek, learn and apply information that is pertinent to the work they are undertaking.

2.3 RELATIONSHIP BETWEEN UNIVERSITY MISSIONS AND THE PROGRAMME AIMS

		UNIVERSITY MISSIONS		
		1	2	3
PEM PROGRAMME AIMS	1	X	X	X
	2	X	X	
	3	X	X	X
	4		X	
	5	X	X	X

		UNIVERSITY MISSIONS		
		1	2	3
ISE PROGRAMME AIMS	1	X	X	X
	2	X	X	
	3	X	X	X
	4		X	
	5	X	X	X

2.4 INTENDED LEARNING OUTCOMES (ILOs) OF THE PROGRAMME

ILOs of PEM award

The attributes of graduates produced by this programme, as listed below, are aligned with the programme aims specified in above, as well as the HKIE programme outcomes.

1. To be versed in the activities of various engineering disciplines, and in particular, product engineering and marketing so as to be able to appreciate and interact with other professionals during execution of their duties.

2. To be able to apply knowledge, procedures (principles, techniques and methods), of engineering and, where appropriate, mathematics and science, to solve product

engineering problems, and to have sufficient understanding of their limitations so that they can select the most appropriate for a particular situation.

3. To have gained some experience and developed the ability in analyzing the market situation and competition environment, identifying market needs and converting them into a new product that satisfy customer needs.

4. To be able to communicate (oral, written, graphical and numerate) effectively.

5. To be able to effectively work individually on their own initiative, and as members of a team.

6. To be aware of the responsibilities and ethics of professional engineers in the modern world and recognise the constraints imposed on the organisations by economic and environmental factors.

7. To possess the ability to engage in life-long learning.

ILOs of ISE award

The attributes of graduates produced by this programme, as listed below, are aligned with the programme aims specified in above, as well as the HKIE programme outcomes.

1. To be versed in the activities of various engineering disciplines, and in particular, industrial and systems engineering so as to be able to appreciate and interact with other engineering professionals during execution of their duties.
2. To be able to apply knowledge, procedures (principles, techniques and methods), of engineering and, where appropriate, mathematics and science, to solve industrial and systems engineering problems, and to have sufficient understanding of their limitations so that they can select the most appropriate for a particular situation.
3. To have gained some experience and developed the ability in applying their knowledge to formulate problems, identify areas in organisations where improvements are necessary, and devise and implement strategies to produce solutions.
4. To be able to communicate (oral, written, graphical and numerate) effectively.
5. To be able to effectively work individually on their own initiative, and as members of a team.
6. To be aware of the responsibilities and ethics of professional engineers in the modern world and recognise the constraints imposed on the enterprise by economic and environmental factors.
7. To possess the ability to engage in life-long learning.

2.5 RELATIONSHIP BETWEEN AIMS AND INTENDED LEARNING OUTCOMES (ILOs) OF THE PROGRAMME

		ILOs OF THE PEM PROGRAMME						
		1	2	3	4	5	6	7
PEM PROGRAMME AIMS	1	X						
	2		X	X		X		
	3				X			
	4						X	
	5							X

		ILOs OF THE ISE PROGRAMME						
		1	2	3	4	5	6	7
ISE PROGRAMME AIMS	1	X						
	2		X	X		X		
	3				X			
	4						X	
	5							X

2.6 INSTITUTIONAL LEARNING OUTCOMES

PolyU is committed to nurturing competent professionals who are also critical thinkers, effective communicators, innovative problem solvers, lifelong learners, ethical leaders and socially responsible global citizens. The institutional learning outcomes for these attributes are provided as follows:

1. **Competent professional**: Graduates should be able to integrate and to apply in-depth discipline knowledge and specialised skills that are fundamental to functioning effectively as an entry-level professional (professional competence); understand the global trends and opportunities related to their professions (global outlook); and demonstrate entrepreneurial spirit and skills in their work, including the discovery and use of opportunities, and experimentation and novel ideas (entrepreneurship).

2. **Critical thinker**: Graduates should be able to examine and critique the validity of information, arguments, and different viewpoints, and reach a sound judgment on the basis of credible evidence and logical reasoning.

3. **Effective communicator**: Graduates should be able to comprehend and communicate effectively in English and Chinese, where appropriate, orally and in writing, in professional and day-today contexts.

4. **Innovative problem solver**: Graduates should be able to identify and define problems in professional and daily contexts, and produce innovative solutions to the problems.

5. **Lifelong learner**: Graduates should be able to recognise the need for continual learning and self-improvement, and be able to plan, manage and evaluate their own learning in pursuit of self-determined development goals.

6. **Ethical leader**: Graduates should have an understanding of leadership and be prepared to serve as a leader and a team player (leadership and teamwork); demonstrate self-

leadership and psychosocial competence in pursuing personal and professional development (intrapersonal competence); be capable of building and maintaining relationship and resolving conflicts in group work situations (interpersonal competence); demonstrate ethical reasoning in professional and day-to-day contexts (ethical reasoning).

7. **Socially responsible global citizen**: Graduates should have the capacity for understanding different cultures and social development needs in the local, national and global contexts (interest in culture and social development); and accept their responsibilities as professionals and citizens to society, their own nation and the world (social, national, and global responsibility).

2.7 RELATIONSHIP BETWEEN INTENDED LEARNING OUTCOMES (ILOs) OF THE PROGRAMME AND INSTITUTIONAL LEARNING OUTCOMES

		INSTITUTIONAL LEARNING OUTCOMES						
		1	2	3	4	5	6	7
ILOs OF PEM PROGRAMME	1	X						
	2	X	X					
	3				X			
	4			X				
	5			X				
	6						X	X
	7					X		

		INSTITUTIONAL LEARNING OUTCOMES						
		1	2	3	4	5	6	7
ILOs OF ISE PROGRAMME	1	X						
	2	X	X					
	3				X			
	4			X				
	5			X				
	6						X	X
	7					X		

2.8 COMPARISON TABLE BETWEEN THE STATED INTENDED LEARNING OUTCOMES (ILOs) OF THE PROGRAMME AND THE HKIE REQUIRED OUTCOMES

HKIE Criteria	HKIE Required Outcomes	ILOs of the PEM award	ILOs of the ISE award
a	An ability to apply knowledge of mathematics, science, and engineering appropriate to the degree discipline	1	2
b	An ability to design and conduct experiments, as well as to analyse and interpret data	3	3
c	An ability to design a system, component or process to meet desired needs within realistic constraints, such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability	2, 3	2, 3

d	An ability to function on multidisciplinary teams	5	5
e	An ability to identify, formulate, and solve engineering problems	2, 5	3, 5
f	An ability to understand of professional and ethical responsibility	6	6
g	An ability to communicate effectively	4	4
h	An ability to understand the impact of engineering solutions in a global and societal context, especially the importance of health, safety and environmental considerations to both workers and the general public	6	6
i	An ability to stay abreast of contemporary issues	7	7
j	An ability to recognize the need for, and to engage in life-long learning	7	7
k	An ability to use the techniques, skills, and modern engineering tools necessary for engineering practice appropriate to the degree discipline	1	1
l	An ability to use the computer/IT tools relevant to the discipline with an understanding of their processes and limitations	2	2

2.9 CURRICULUM MAP THAT WE TEACH (T), GIVE STUDENTS PRACTICE (P) AND MEASURE (M) THE INTENDED LEARNING OUTCOMES (ILOs) OF THE PROGRAMME

PEM award

SUBJECT CODES	SUBJECT TITLES	ILOs OF THE PROGRAMME						
		1	2	3	4	5	6	7
AF3625	Engineering Economics			TP			TP	
AMA1110	Basic Mathematics I – Calculus and Probability and Statistics		TP					
AMA1120	Basic Mathematics II – Calculus and Linear Algebra		TP					
AMA2111	Mathematics I		TP					
AP10005	Physics I		TP					
AP10006	Physics II		TP					
APSS1L01	Tomorrow's Leader					TP		
CLC1104C/P	University Chinese				TP			
CLC3241P	Professional Communication in Chinese				TP			P
EIE2302	Electricity and Electronics		TP					
ELC1011	Practical English for University Studies				TP			

SUBJECT CODES	SUBJECT TITLES	ILOs OF THE PROGRAMME						
		1	2	3	4	5	6	7
ELC1012/3	English for University Studies				TP			
ELC2011	Advanced English Reading and Writing Skills				TP			
ELC2012	Persuasive Communication				TP			
ELC2013	English in Literature and Film				TP			
ELC2014	Advanced English for University Studies				TP			
ELC3531	Professional Communication in English for Engineering Students				TPM			P
ENG2001^{+}	Fundamentals of Materials Science and Engineering		TP					
ENG2003	Information Technology		TP			P		
ENG3003	Engineering Management	TP	TP			P		
ENG3004	Society and the Engineer	T	TP		TP	P	TPM	
ISE1001	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life	T	TP	TP			T	TP
ISE2002	Instrumentation and Automation Systems		TP				TP	TP
ISE2105	Engineering Communication and Fundamentals	TP	TP		TP		T	T
ISE2121	Appreciation of Manufacturing Technologies	TP	TP					
ISE306	Tool Design	TP	TP	TP	P	P		
ISE330	Product Safety and Reliability	T	T	P	P		T	P
ISE369	Quality Engineering	T	TP					
ISE386	Integrated Design for Manufacture	T	TP		P	P		
ISE3001	Operations Research I	T	TP	TP	TP	P		
ISE3007	Integrated Product Engineering Project I	T	TP	T	T	P	T	
ISE3019	Industrial Control Systems and Their Applications		TP				TP	TP
ISE3103	Integrated Project	P	PM	P	P	PM	PM	P
ISE404	Total Quality Management	TP		T			T	

SUBJECT CODES	SUBJECT TITLES	ILOs OF THE PROGRAMME						
		1	2	3	4	5	6	7
ISE418	Computer-Aided Product Design	T	TP		P	P	T	P
ISE430	New Product Planning and Development	TPM		TPM	P	P		
ISE445	Capstone Project	PM	PM	PM	TPM	PM		PM
ISE4005	Eco-design and Manufacture	T	TP	TP	P	P	TP	P
ISE4009	Advanced Manufacturing Technology		TP		TP	P		P
ISE4024	Robotics and Automation Systems		TP				TP	TP
MM1031	Introduction to Innovation and Entrepreneurship			TP			TP	
MM2711	Introduction to Marketing	T		TP	P	P	T	
MM3761	Marketing Research		TP	TP	P	P		
MM4711	Business to Business Marketing			TP	P	P	T	
MM4721	Marketing Management in China			TP	P	P		
MM4732	Global Marketing			TP	P	P	TP	
MM4782	Sales and Distribution Management			TP	P	P		
SD348	Introduction to Industrial Design		TP	TP	TP	TP	TP	T
SD4041	Design in Business for Engineering	TP		TP		P		
SD4463	Sustainable Product Design	TP		TP		P	TP	
Work Integrated Education (WIE)						PM		PM

GUR subjects of service-learning, cluster area requirement (CAR), and healthy lifestyle not directly linked with the outcomes are not included.

[+] It may be replaced by a level one chemistry or biology subject.

ISE award

SUBJECT CODES	SUBJECT TITLES	ILOs OF THE PROGRAMME						
		1	2	3	4	5	6	7
AF3625	Engineering Economics			TP			TP	
AMA1110	Basic Mathematics I – Calculus and Probability and Statistics		TP					
AMA1120	Basic Mathematics II – Calculus and Linear Algebra		TP					
AMA2111	Mathematics I		TP					
AP10005	Physics I		TP					
AP10006	Physics II		TP					
APSS1L01	Tomorrow's Leader					TP		
CLC1104C/P	University Chinese				TP			
CLC3241P	Professional Communication in Chinese				TP			P
EIE2302	Electricity and Electronics		TP					
ELC1011	Practical English for University Studies				TP			
ELC1012/3	English for University Studies				TP			
ELC2011	Advanced English Reading and Writing Skills				TP			
ELC2012	Persuasive Communication				TP			
ELC2013	English in Literature and Film				TP			
ELC2014	Advanced English for University Studies				TP			
ELC3531	Professional Communication in English for Engineering Students				TPM			P
ENG2001^{+}	Fundamentals of Materials Science and Engineering		TP					
ENG2003	Information Technology		TP			P		
ENG3003	Engineering Management	TP	TP			P		
ENG3004	Society and the Engineer	T	TP		TP	P	TPM	
ENG4001	Project Management		TP	TP	P	T		

SUBJECT CODES	SUBJECT TITLES	ILOs OF THE PROGRAMME						
		1	2	3	4	5	6	7
ISE1001	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life	T	TP	TP			T	TP
ISE2002	Instrumentation and Automation Systems		TP				TP	TP
ISE2105	Engineering Communication and Fundamentals	TP	TP		TP		T	T
ISE2121	Appreciation of Manufacturing Technologies	TP	TP					
ISE318	Industrial Engineering Techniques and Methods	T	TPM	TP	P	P		P
ISE330	Product Safety and Reliability	T	T	P	P		T	P
ISE369	Quality Engineering	T	TP					
ISE386	Integrated Design for Manufacture	T	TP		P	P		
ISE3001	Operations Research I	T	TP	TP	TP	P		
ISE3002	Planning of Production and Service Systems	TP	TP	TP	P		T	
ISE3004	Systems Modeling and Simulation	TP	TP	TP	P	P		P
ISE3006	Materials and Processes Selection		TPM		TP	P		
ISE3019	Industrial Control Systems and Their Applications		TP				TP	TP
ISE3103	Integrated Project	P	PM	P	P	PM	PM	P
ISE404	Total Quality Management	TP		TP			T	
ISE418	Computer-Aided Product Design		TP	TP	TP	P		
ISE430	New Product Planning and Development	TP		TP	P	P		
ISE431	Engineering Costing and Evaluation		TPM	TP			TP	
ISE449	Mobile Technologies for Logistics Systems	T	TP		TP	TP		
ISE457	Business Process Management		TP	TP		TP		
ISE461	Green Legislation and Supply Chain Logistics	TP		TP			T	TP
ISE4004	Enterprise Resources Planning	T	P	TP	P	P		TP
ISE4005	Eco-design and Manufacture	T	TP	TP	P	P	TP	P

SUBJECT CODES	SUBJECT TITLES	ILOs OF THE PROGRAMME						
		1	2	3	4	5	6	7
ISE4008	Individual Project	PM	PM	PM	TPM	PM		PM
ISE4009	Advanced Manufacturing Technology	TP	TP	TP	TP			P
ISE4024	Robotics and Automation Systems		TP				TP	TP
MM1031	Introduction to Innovation and Entrepreneurship			TP			TP	
Work Integrated Education (WIE)						PM		PM

GUR subjects of service-learning, cluster area requirement (CAR), and healthy lifestyle not directly linked with the outcomes are not included.

[+] It may be replaced by a level one chemistry or biology subject.

FEEDBACK PROCESS

The Departmental Undergraduate Programme Committee and the Programme Leader are the elements of a feedback system in programme management. Their responsibilities include examining the information received from the stakeholders, modifying the plan as appropriate, using appropriate measurement data to evaluate the intended learning outcomes of the programme as the process is implemented, and suggesting changes in the subject content, the extracurricular content or any other revisions needed to improve the programme when its performance falls short of the benchmarks.

SECTION 3 - ADMISSION TO THE PROGRAMME

FREQUENCY OF ADMISSION AND REGISTRATION

3.1 Students are admitted into the programme on an annual basis into Semester 1 of the academic year.

MINIMUM ENTRANCE REQUIREMENTS

3.2 Candidates applying with Hong Kong Diploma Secondary Education (HKDSE) or equivalent.

- Level 3 in HKDSE English Language and Chinese Language; and
- Level 2 in Mathematics; and
- Level 3 in 2 Other Elective subjects [can include Extended Modules of Mathematics (M1/M2)]; and
- An attainment at "Attained" in Citizenship and Social Development

The following Applied Learning Subjects are recognized for meeting the University entrance requirement and admission score calculation:

- Accounting for E-Business;
- Accounting in Practice;
- Applied Business Research;
- Applied Psychology;
- Automotive Technology;
- Aviation Studies;
- Business Data Analysis / Data Application for Business;
- Computer Forensic Technology;
- Computer Game and Animation Design;
- Creative Advertising;
- Display and Jewellery Design;
- Electrical and Energy Engineering;
- Entrepreneurship for SME;
- Health Care Practice;
- Innovation Product Design;
- Interior Design;
- Internet of Everything Application;
- Jewellery and Accessories Design;
- Jewellery Arts and Design;
- Law Enforcement in Hong Kong;
- Marketing and Online Promotion;
- Practical Psychology; and
- Teach Basics.

CANDIDATES APPLYING WITH AN ASSOCIATE DEGREE OR HIGHER DIPLOMA

3.3 Candidates who hold an Associate Degree or Higher Diploma in a relevant discipline will be eligible to join the programme. The admission of such candidates will be at the discretion of the Programme Leader in conjunction with the Admissions Officer and the regulations regarding subject exemption and credit transfer arrangements stated in Section 6.8 – 6.18 will apply.

CANDIDATES APPLYING UNDER EXCEPTIONAL CIRCUMSTANCES

3.4 Candidates who hold equivalent qualifications to those stated above in 3.2 and 3.3 above are also eligible to join the programme.

PROGRAMME DECLARATION (NOT APPLICABLE TO SENIOR YEAR STUDENTS)

3.5 The BEng (Hons) Scheme in Product and Industrial Engineering is composed of two awards: BEng (Hons) in Product Engineering with Marketing and BEng (Hons) in Industrial and Systems Engineering. Students admitted to the scheme have the freedom to make their programme choice without quota restrictions. However, they should submit a reply form to the Department to declare their target award no later than the end of semester one in their second year of study.

MINOR STUDY (NOT APPLICABLE TO SENIOR YEAR STUDENTS)

3.6 Minor study will be a free choice by students and not mandatory. Normally, this option to study for a Minor will not be applicable to students who are admitted to the advanced stage of a programme, nor to students who are admitted to an articulation degree programme. On the other hand, students admitted on the basis of advanced standing may be allowed to study for a Minor, if so decided by the programme-host Department. This decision will be made at the time of admission, based on the merits of each individual case. (In this respect, students who are approved for transfer of study, deferment of study, or zero credit enrolment will be given the same allowance as for students admitted on the basis of advanced standing.) Each student is allowed to take not more than one Minor. Students who opt for Minor study will be subject to the following regulations:-

(i) A Minor programme is a collection of subjects totalling 18 credits with at least 50% (9 credits) of the subjects at Level 3 or above. The subjects under a Minor should have a coherent theme introducing students to a focused area of study.

(ii) Students interested in a Minor must submit their applications to and obtain approval from the Minor-offering Department, at the start of second year of study. Students should submit their applications to their Major Department, which will indicate its support or otherwise (since the taking of a Minor will increase the student's study load), before the Minor-offering Department makes a final decision on the application;

(iii) Students are expected to complete their approved Minor as part of their graduation requirements. Students who wish to withdraw from a Minor need to apply for approval officially from the Minor offering department, before the end of the add/drop period of the last Semester of study;

(iv) Students with approved Minor will be given a higher priority in taking the Minor subjects over the students who take the subjects as free-electives. 'Free electives' under the 4-year Ug degree programmes refers to any subjects (including CAR subjects) offered by the University, unless otherwise specified;

(v) Subject to approval by the Minor-offering Department, students may count up to 6 credits from their Major/General University Requirement (GUR) [including Language Communication Requirement (LCR) subjects at proficiency level] towards their chosen Minor. Nevertheless, students must take at least 6 credits from their chosen Minor programme in order to satisfy the residential requirement of their chosen Minor. In addition, to be eligible for the Major and Minor awards, the total number of credits taken by the students for their Major-Minor studies must not be lower than the credit requirement of the single discipline Major programme.

(vi) Credit transfer can be given for not more than 9 credits of a Minor programme if the previous credits were earned from approved institutions outside of the university; and not more than 12 credits of a Minor programme if the previous credits were earned from programmes offered by PolyU;

(vii) Only students with a Grade Point Average (GPA) of 2.5 or above can be considered for Minor study enrolment. The Minor-offering Department may set a quota (normally capped at 10 students or 20% of the Major intake quota) and additional admission requirements for their Minor; and

(viii) Students are required to obtain a GPA of at least 1.70 in order to satisfy the requirement for graduation with a Major plus a Minor.

A Minor-offering Department can admit students enrolled on Major programmes offered by other Departments and on its own Major programme(s). Enrolment of students from Major programmes outside the Department will be subject to the quota approved for the Minor although the Minor-offering Department can admit more students as long as the number does not exceed the approved quota by more than 20%, if there is a strong demand. As for admission of its own students, there is no limit on the number.

Notwithstanding 3.6 (iv) above, there is no guarantee that a clash-free timetable can be provided for all students who pursue Minor study. Minor-offering Departments will be responsible for ensuring that students enrolled on their Minors can take the requisite subjects and graduate within the normative study period.

SECONDARY MAJOR (NOT APPLICABLE TO SENIOR YEAR STUDENTS)

3.7 Students enrolling on programmes which have been approved with the 'X + Scheme' option can choose to take a Secondary Major. Only UGC-funded undergraduate degree programmes can be offered as a Block X, where X is a block of subjects selected from an existing programme or specially designed to satisfy particular disciplinary knowledge requirements. The minimum credit requirements of Block X is 66 credits.

3.8 Studying on a Secondary Major is a free choice by students and not mandatory. Normally, this option to study for a Secondary Major will not be applicable to students admitted to the advanced stage of a programme, nor to students admitted to an articulation degree programme. On the other hand, students admitted on the basis of advanced standing may be allowed to study for a Secondary Major, if so decided by the programme offering Department. This decision will be made at the time of admission, based on the merits of each individual case (in this respect, students who are approved for transfer of study, deferment of study, or zero subject enrolment will be given the same allowance as students admitted on the basis of advanced standing). Each student may take not more than one Secondary Major. Students who opt for a Secondary Major will be subject to the following regulations:-

(i) Students are expected to complete the "X + Secondary Major" within the normal duration of the major programme.

(ii) Students may count up to 12 credits of their Major/GUR subjects towards the Secondary Major. Nevertheless, students must take at least 12 credits from their chosen Secondary Major in order to satisfy the residential requirement of the chosen Secondary Major. Students who have completed more than 12 credits of subjects that are eligible for double counting will need to apply for graduation and indicate the subjects intended for double counting. Notwithstanding the above, students must meet the minimum credit requirements of the "X + Secondary Major" concerned, i.e. 132 credits.

(iii) Students must apply to and obtain approval from the programme offering Department, normally no later than the commencement of the second year of study, to be admitted to the Secondary Major.

(iv) Only students with a Cumulative GPA of 2.70 or above may be considered for Secondary Major enrolment. Each Secondary Major may stipulate additional selection criteria for admission.

(v) Students must complete the Secondary Major as part of their graduation requirements. Students who wish to withdraw from the Secondary Major must obtain approval from the programme offering Department normally before the end of the add/drop period of the last semester of study.

(vi) If deemed appropriate by the programme offering Department, students are allowed to take a Major with a Secondary Major and a Minor. Subjects already double-counted for the Major and Secondary Major cannot be used to fulfil the Minor requirement.

DOUBLE MAJOR (NOT APPLICABLE TO SENIOR YEAR STUDENTS)

3.9 Double Major will provide an opportunity for the more capable students, who are interested in expanding their study beyond a single degree, to take a Second Major study. Students who opt for a double Major study will be subject to the following regulations:

(i) Completion of Double Major requires more than the normative study period of 4/5 years and extra credits on self-financed basis (i.e. higher tuition fee). The total credit requirements of a Double Major will depend on the degree of commonality between the 2 Majors. Apart from the 30 credits of GUR subjects, up to 1/3 of the Discipline-Specific Requirements (DSR) of the First Major which are common to the Second Major can be double-counted towards the Second Major.

(ii) Students who wish to take a Second Major must obtain approval from the host Department of the first Major. They can then submit their applications to the second Major-offering department starting from their second year of study. Only students with a GPA of 3.0 above can be considered for admission to a Second Major, while Departments offering the Second Major can stipulate a higher GPA requirement if appropriate.

(iii) Students enrolled in a second Major will be given priority in taking second Major subjects over the students who take the subjects as free electives.

(iv) Students will be put on academic probation if they fail to obtain a GPA of 1.70 or above.

(v) Students are required to obtain an overall GPA of at least 1.70, in order to satisfy the requirement for graduation with Double Major. They will not be allowed to graduate with one of the 2 Majors.

(vi) Students who wish to withdraw from a Second Major must obtain approval from the Department offering the Second Major, normally before the end of the add/drop period of the last Semester of study.

(vii) Students will not be allowed to withdraw from a First Major and continue with the Second Major only.

SELECTION PROCEDURE

3.10 The admission procedures will be coordinated by the Admissions Officer. Candidates applying with HKDSE or equivalent will be selected on the basis of their qualifications and academic achievement. Candidates applying without HKDSE or equivalent will be selected on the basis of academic achievement and by interview and/or admission test. However, preference may be given to industry sponsored candidates and those with relevant experience in industry.

SECTION 4 - CURRICULUM STRUCTURE

4.1 The curriculum structure are illustrated on progression pattern for normal students and senior year students on pages 4-6 to 4-11 and page 4-12 to 4-14 respectively.

GENERAL UNIVERSITY REQUIREMENTS (GUR)

4.2 Normal students are required to complete 30 credits of GUR subjects which are language and communications requirements, AIDA requirement, IE requirement, leadership education and development, service-learning, cluster areas requirement and healthy lifestyle. It is further explained in Appendix I. Senior year students are required to complete 9 credits of GUR which are cluster areas requirement, service-learning and essential components of general education (non-credit bearing). It is also further explained in Appendix II.

COMPULSORY AND ELECTIVE SUBJECTS

PEM award

4.3 The PEM programme has been planned with the primary aim of producing PEM graduates capable of fulfilling what we visualise as being their duties on employment and in large measure, the curriculum content has been designed to achieve this obligation. By virtue of the fact that PEM is by its nature, a broad discipline, most of the subjects in the curriculum are compulsory and provide a balance devoted to both areas. This, to some extent, restricts the scope for flexibility of students to pursue subject of their own particular interest yet still being retained under the broad spectrum of this programme. However, some choice has been made available by including a number of elective subjects at level 4. There are three electives which would normally be taken from Year 2 to Year 4.

4.4 The 6-credit *Capstone Project (ISE445)* provides students with a vehicle to work independently on a specific task of their choice under the supervision of an academic staff member.

ISE award

4.5 The ISE programme has been planned with the primary aim of producing ISE graduates capable of fulfilling what we visualise as being their duties on employment and in large measure, the curriculum content has been designed to meet this obligation. However, ISE is by its nature, a very broad discipline, most of the subjects in the curriculum are compulsory so as to provide a balance devoted to design, technology and management. This, to some extent restricts the scope for flexibility of students to pursue subjects of their own particular interest yet still being retained under the broad spectrum of ISE. However, some choice has been made available by including a number of elective subjects at Level 4. There are two elective areas “Product Technology” and “Operations Management” which would normally be taken during Year 4. If so, as a guideline, he/she will take the TWO specific electives in the chosen elective area. In this way, apart from being able to specialize on a particular elective area, his/her interest in subjects contained in other elective areas can also be accommodated.

4.6 *Integrative Studies in Product and Process Design (ISE3008)* is taken in semester 1 and 2 of Year 3 of the programme. The subject is student-centered and a group project based. The student’s interest is stimulated through a problem-based learning approach. Case studies, seminars/lectures and guided studies are used. Task activities begin with an analysis of a newly proposed product from the marketing perspective. Students are required to conduct detailed product and parts design. Analysis techniques and methodologies are applied to study the product in terms of parts, material, manufacturing processes, tooling, environment and cost.

INDUSTRIAL CENTRE BASED TRAINING

4.7 This is of 10 weeks duration and is undertaken in the University's Industrial Centre. The first 4 weeks compose of Engineering Drawing & CAD, Basic Scientific Computing, Basic Mechatronics Practices and Industrial Safety and are taken during the semester 1 & 2 of Year 1. It is followed by 3 weeks of integrated practical training, the Appreciation of Manufacturing Technologies, and 3 weeks of Integrated Project. Both subjects are taken during semester 1 & 2 of Year 2.

4.8 A variety of objectives are fulfilled by this training experience and these are listed below. However, all of these are but facets of one over-riding aim to create, within the time limitations, an environment of learning by doing under a holistic approach. Objectives of these training periods are:

(i) to develop in the students "industrial safety consciousness" to familiarise them with safe work practices, acquaint them with the hazards of various engineering activities, and to develop a sense of responsibility for the safety of themselves and others;

(ii) to develop the students' ability to produce and interpret engineering drawings and specifications, and to give them an understanding of the importance of CAD/engineering documentation;

(iii) to give the students a broad acquaintance with and a grasp of ISE practices in engineering (and other) industries in order to integrate/relate their theoretical knowledge to the real industrial application;

(iv) to enable the students to appreciate the skills associated with processing of materials; in addition, to afford them an opportunity to appreciate, in a rudimentary manner, the extent to which good design can facilitate production and assembly in manufacturing industries;

(v) to enable the students to gain a holistic understanding of the selection of materials, production processes, typical mechatronics systems and design considerations of manufactured products and the complex interaction between them.

4.9 During the Industrial Centre based training period, students undertake specific subjects in the following areas in order to achieve the above mentioned objectives.

(i) Engineering Communication and Fundamentals (ISE2105) (during the semester 1 & 2 of Year 1);

(ii) Appreciation of Manufacturing Technologies (ISE2121) (during the semester 1 of Year 2);

(iii) Integrated Project (ISE3103) (during the semester 1 & semester 2 of Year 2).
Detail training subject descriptions of (i) to (iii) can be found in Section 9 – IC Training Subjects and Modules.

CAPSTONE PROJECT

4.10 The *Capstone Project (ISE445)* is carried out in the final year of the PEM programme. This subject is conducted using an integrated project-based learning approach. Students work on an individual project selected or proposed in the stream area of PEM. An academic supervisor is assigned to guide and monitor the progress of the project. There is a final project presentation and each student is required to submit a project report.

Throughout the duration of the project, supervisors make themselves available for discussions with their students at meetings arranged at mutually convenient times. To aid students in organizing their project in a systemic manner, students are required to submit a progress report, which provides detailed records of the various stages of project work.

The proposed project defined by the student and/or the supervisor should be in an area relevant to the discipline. The project will be used as a vehicle for the student to integrate his/her knowledge gained in the programme. In order to achieve the subject learning outcomes, it is not appropriate to have projects mainly focused on literature review or pure computer programming. Depends on the nature of the project, the work covers by the students may include the background and scope of the project; literature review, field works; experiments; data collection; case studies; methodology; discussion; and conclusion.

Upon completion of the subject, students will be able to

(i) define a problem by understanding its background, then set the objectives and deliverables of a project that addresses a significant issue relevant to the goal pursued by the student;

(ii) develop and implement the strategies and methodology to achieve the project objectives within a given set of constraints;

(iii) communicate effectively with stakeholders of the project and work independently to achieve the project objectives and produce the deliverables;

(iv) prepare, present, and defend a clear, coherent, and succinct project report.

THE INDIVIDUAL PROJECT

4.11 The *Individual Project (ISE4008)* is carried out in the final year of the ISE programme and is mostly industry-related. The project topic and supervisor will be chosen by the students towards the end of Year 3 so they can spend some time gathering information and undertake preliminary planning prior to the start of the final year of the programme. Students may also propose their project topic subject to approval by the supervisor. During their final year students are allocated one day per week for their project and normally spend at least one full day per week on this activity.

4.12 While the specific objectives to be met by the individual project may differ from one project to another, they should offer students the opportunities as specified below:

(i) to seek for themselves the information from which to make a critical assessment of an understanding of a phenomenon and/or of the procedures available to achieve a desired objective;

(ii) to be able to decide from the wealth of existing knowledge, that which is relevant to his particular undertaking thus to be able to select the knowledge or procedures most

appropriate to his specific purpose or to make appropriate amendments to the procedure so as to make it applicable;

(iii) to define one (or more) problem from a given situation, thereafter to decide which (if there are more than one) are to be pursued, to assign them relative priorities and to develop strategies by which the problems may be solved;

(iv) to implement these strategies, to re-define each problem as more is learned of its true nature;

(v) to work with time and financial constraints, to take decisions on the basis of incomplete information, to prepare, submit and defend a coherent, succinct, ordered report.

WORK INTEGRATED EDUCATION (WIE)

4.13 Work Integrated Education (WIE) is defined as a structured and measurable learning experience which takes place in an organisational context relevant to a student's future profession, or to the development of generic skills that will be valuable in that profession. It is included in the programme to enable students to obtain a better understanding of real-life work experience relevant to the discipline of studies they pursue as well as to further enhance their all-round development. Students must complete WIE before graduation.

4.14 WIE must be a cooperative venture between the PolyU Department and the work organization. In order to enhance the feasibility of placement arrangements, and to provide more flexibility to Departments so they can take account of the specific situations of individual industries, WIE is intended to be flexible. Examples of activity types that are regarded as satisfying the WIE requirement are given as follows:

(i) Summer placement (of normally 2-month duration) in a suitable organization participating in the Preferred Graduate Development Programme.

(ii) Any other placement in any suitable external organization for a specified period of time.

(iii) Any collection of community service programmes of an acceptable aggregate duration.

(iv) Any jobs found by the student himself in an external organization and deemed to be suitable by the Department and the Dean in meeting the requirement of WIE. Such jobs must be declared by the student in advance so that the Department can have an opportunity to assess its suitability.

(v) Relevant placement as student helpers in PolyU administrative departments and Industrial Centre.

(vi) Assisting in PolyU activities that have an external collaboration or service component such as, Innovation and Technology Fund projects, Rapid Product Development Syndicate projects, Industrial Guided Applied Research and Development projects, high-level consultancy projects, collaborative research projects that we undertake with external organizations, jobs undertaken by the Industrial Centre as a service for an external organization.

(vii) Placement with the IAESTE (International Association for the Exchange of Students for Technical Experience) Programme in which the student is attached to a workplace abroad during the training.

Please also refer to the WIE Handbook published by the Student Affairs Office (SAO) available at https://www.polyu.edu.hk/sao/cps/career-services/about/publications/#booklets-and-leaflets.

PROGRESSION PATTERN OF THE CURRICULUM
COMMON FIRST AND A HALF YEARS

1. (a) For students who have Level 2 or above in HKDSE Physics (or Combined Science with a component in Physics), or the equivalent qualifications.
(b) For non-local students from the Chinese Mainland who have a Pass (a pass is taken as 60% of the total marks of the subject) in the Physics or Integrated Science subject in Joint Entrance Examination for universities.

(Total Credits Required for Graduation: 124 academic credits + 10 IC training credits)

Year 1 (33 academic credits + 4 IC training credits)			
Semester 1 (18 credits + 2 IC)		**Semester 2 (15 credits + 2 IC)**	
Healthy Lifestyle#	0	Healthy Lifestyle# – cont'd	0
English I (LCR I)#	3	English II (LCR II)#	3
CAR I#	3	Introduction to Innovation and Entrepreneurship (MM1031)#	1
CAR II#	3	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life (ISE1001)#	2
Tomorrow's Leader (APSS1L01)#	3	Information Technology (ENG2003)	3
Basic Mathematics I – Calculus and Probability and Statistics (AMA1110)	3	Basic Mathematics II – Calculus and Linear Algebra (AMA1120)	3
Physics I (AP10005)	3	Physics II (AP10006)	3
Engineering Communication and Fundamentals (ISE2105)	2 IC	Engineering Communication and Fundamentals (ISE2105) – cont'd	2 IC
Year 2			
Semester 1 (18 credits)		**Choose either PEM or ISE award**	
CAR III#	3		
Chinese Communication (LCR III)#	3		
Fundamentals of Materials Science and Engineering (ENG2001) / Biology@ / Chemistry+	3		
Mathematics I (AMA2111)	3		
Engineering Economics (AF3625)	3		
Quality Engineering (ISE369)	3		

2. (a) For students who do not have Level 2 or above in HKDSE Physics (or Combined Science with a component in Physics), or the equivalent qualifications.
(b) For non-local students from the Chinese Mainland who do not have a Pass (a pass is taken as 60% of the total marks of the subject) in the Physics or Integrated Science subject in Joint Entrance Examination for universities.
Students are required to take and complete "Introduction to Physics (AP10001)" which also fulfil a CAR D subject before graduation.

(Total Credits Required for Graduation: 124 academic credits + 10 IC training credits)

Year 1 (30 academic credits + 4 IC training credits)			
Semester 1 (15 credits + 2 IC)		**Semester 2 (15 credits + 2 IC)**	
Healthy Lifestyle#	0	Healthy Lifestyle# – cont'd	0
English I (LCR I)#	3	English II (LCR II)#	3
CAR I# Introduction to Physics (AP10001) = CAR D	3	Introduction to Innovation and Entrepreneurship (MM1031)#	1
CAR II#	3	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life (ISE1001)#	2
Tomorrow's Leader (APSS1L01)#	3	Information Technology (ENG2003)	3
Basic Mathematics I – Calculus and Probability and Statistics (AMA1110)	3	Basic Mathematics II – Calculus and Linear Algebra (AMA1120)	3
-		Physics I (AP10005)	3
Engineering Communication and Fundamentals (ISE2105)	2 IC	Engineering Communication and Fundamentals (ISE2105) – cont'd	2 IC
Year 2			
Semester 1 (21 credits)		**Choose either PEM or ISE award**	
CAR III#	3		
Chinese Communication (LCR III)#	3		
Fundamentals of Materials Science and Engineering (ENG2001) / Biology@ / Chemistry+	3		
Mathematics I (AMA2111)	3		
Engineering Economics (AF3625)	3		
Quality Engineering (ISE369)	3		
Physics II (AP10006)	3		

PROGRESSION PATTERN OF PEM CURRICULUM

Year 2			
		Semester 2 (14 credits + 3 IC)	
		CAR IV#	3
		Introduction to Marketing (MM2711)	3
		Electricity and Electronics (EIE2302)	3
		Professional Communication in Chinese (CLC3241P)	2
		Society and the Engineer (ENG3004)	3
		Appreciation of Manufacturing Technologies (ISE2121)	3 IC
Year 3 (29 academic credits + 3 IC training credits)			
Semester 1 (15 credits + 1.5 IC)		**Semester 2 (14 credits + 1.5 IC)**	
Instrumentation and Automation Systems (ISE2002)	3	Service Learning#	3
Integrated Design for Manufacture (ISE386)	3	Tool Design (ISE306)	3
Operations Research I (ISE3001)	3	Integrated Product Engineering Project I (ISE3007)	3
Introduction to Industrial Design (SD348)	3	Professional Communication in English for Engineering Students (ELC3531)	2
Marketing Research (MM3761)	3	Engineering Management (ENG3003)	3
Integrated Project (ISE3103)	1.5 IC	Integrated Project (ISE3103) – cont'd	1.5 IC
Year 4 (30 academic credits)			
Semester 1 (15 credits)		**Semester 2 (15 credits)**	
Computer-Aided Product Design (ISE418)	3	Product Safety and Reliability (ISE330)	3
New Product Planning and Development (ISE430)	3	Eco-design and Manufacture (ISE4005)	3
Industrial Control Systems and Their Applications (ISE3019)	3	Business to Business Marketing (MM4711)	3
Elective 1	3	Robotics and Automation Systems (ISE4024)	3
Capstone Project (ISE445)	3	Capstone Project (ISE445) – cont'd	3

Elective subjects for PEM

Electives	Select any **ONE** from the following subjects
	• Total Quality Management (ISE404) • Advanced Manufacturing Technology (ISE4009) • Marketing Management in China (MM4721) • Global Marketing (MM4732) • Sales and Distribution Management (MM4782) • Design in Business for Engineering (SD4041) • Sustainable Product Design (SD4463)

PROGRESSION PATTERN OF ISE CURRICULUM

Year 2			
		Semester 2 (15 credits + 3 IC)	
		CAR IV#	3
		Electricity and Electronics (EIE2302)	3
		Product Safety and Reliability (ISE330)	3
		Engineering Management (ENG3003)	3
		Systems Modeling & Simulation (ISE3004)	3
		Appreciation of Manufacturing Technologies (ISE2121)	3 IC
Year 3 (31 academic credits + 3 IC training credits)			
Semester 1 (18 credits + 1.5 IC)		**Semester 2 (13 credits + 1.5 IC)**	
Operations Research I (ISE3001)	3	Service-Learning#	3
Planning of Production and Service Systems (ISE3002)	3	Professional Communication in English for Engineering Students (ELC3531)	2
Integrated Design for Manufacture (ISE386)	3	Professional Communication in Chinese (CLC3241P)	2
Materials and Processes Selection (ISE3006)	3	Business Process Management (ISE457)	3
Industrial Engineering Techniques and Methods (ISE318)	3	Elective 1	3
Instrumentation and Automation Systems (ISE2002)	3	-	-
Integrated Project (ISE3103)	1.5 IC	Integrated Project (ISE3103) – cont'd	1.5 IC
Year 4 (27 academic credits)			
Semester 1 (15 credits)		**Semester 2 (12 credits)**	
Enterprise Resources Planning (ISE4004)	3	Total Quality Management (ISE404)	3
Society and the Engineer (ENG3004)	3	Engineering Costing and Evaluation (ISE431)	3
Project Management (ENG4001)	3	Robotics and Automation Systems (ISE4024)	3
Industrial Control Systems and Their Applications (ISE3019)	3	-	-
Individual Project (ISE4008)	3	Individual Project (ISE4008) – cont'd	3

Elective subjects for ISE

Electives	Select any **ONE** from the following subjects
	• Computer-Aided Product Design (ISE418) • New Product Planning and Development (ISE430) • Mobile Technologies for Logistics Systems (ISE449) • Green Legislation and Supply Chain Logistics (ISE461) • Eco-design and Manufacture (ISE4005) • Advanced Manufacturing Technology (ISE4009)

General University Requirements (GUR) The pattern for GUR subjects are indicative only. Students may take these subjects according to their own schedule.

@Biology subjects are listed below:

- Biotechnology and Human Health (ABCT1D03/ABCT1303)~
- Introductory Life Science (ABCT1D04/ABCT1101)~
- Bionic Human and the Future of Being Human (BME1D01/BME11101)~

+Chemistry subjects are listed below:

- Chemistry and Modern Living (ABCT1D01/ABCT1301)~
- Chemistry and Sustainable Development (ABCT1D14/ABCT1314)~

Double Fulfilment of DSR and CAR

Some DSR subjects are also designated as CAR subjects under the four cluster areas. They are the same subjects designated with different subject codes. Upon passing them, you will fulfill the requirements of both DSR and CAR. However, credits will not be counted twice. For example, if you have taken MM2711, you have fulfilled the CAR BN requirement and earned only 3 credits instead of 6 credits. So you may need to take other subjects to make up the total credit requirement of the award. The list of subjects that fulfill both DSR and CAR are shown below:

DSR Subjects	CAR Subjects	Cluster Area	Subject Title
MM2711	MM2BN05	CAR – BN	Introduction to Marketing
ABCT1101	ABCT1D04	CAR – D	Introductory Life Science
ABCT1301	ABCT1D01	CAR – D	Chemistry and Modern Living
ABCT1314	ABCT1D14	CAR – D	Chemistry and Sustainable Development
ABCT1303	ABCT1D03	CAR – D	Biotechnology and Human Health
BME11101	BME1D01	CAR – D	Bionic Human and the Future of Being Human
AP10001	AP1D03	CAR – D	How Things Work: the Physics of Everyday Life

PROGRESSION PATTERN OF THE CURRICULUM – FOR SENIOR YEAR STUDENTS

BEng (Hons) in Product Engineering with Marketing

(Total Credits Required for Graduation: 64 academic credits* + 6 IC training credits)

Year 1 (37 academic credits + 6 IC training credits)			
Semester 1 (20 credits + 1.5 IC)		**Semester 2 (17 credits + 4.5 IC)**	
CAR A - Specially-designed with English Language^	3	CAR M#	3
Instrumentation and Automation Systems (ISE2002)	3	Professional Communication in English for Engineering Students (ELC3531)	2
Professional Communication in Chinese (CLC3241P)	2	Engineering Management (ENG3003)	3
Quality Engineering (ISE369)	3	Tool Design (ISE306)	3
Integrated Design for Manufacture (ISE386)	3	Integrated Product Engineering Project I (ISE3007)	3
Society and the Engineer (ENG3004)	3	Service Learning#	3
Marketing Research (MM3761)	3	Appreciation of Manufacturing Technologies (ISE2121)	3 IC
Integrated Project (ISE3103)	1.5 IC	Integrated Project (ISE3103) – cont'd	1.5 IC
Year 2 (27 academic credits)			
Semester 1 (15 credits)		**Semester 2 (15 credits)**	
Operations Research I (ISE3001)	3	Robotics and Automation Systems (ISE4024)	3
Computer-Aided Product Design (ISE418)	3	-	3
New Product Planning and Development (ISE430)	3	Eco-design and Manufacture (ISE4005)	3
Industrial Control Systems and Their Applications (ISE3019)	3	Business to Business Marketing (MM4711)	3
Capstone Project (ISE445)	3	Capstone Project (ISE445) – cont'd	3

PROGRESSION PATTERN OF THE CURRICULUM – FOR SENIOR YEAR STUDENTS

BEng (Hons) in Industrial and Systems Engineering

(Total Credits Required for Graduation: 64 academic credits* + 6 IC training credits)

Year 1 (34 academic credits + 6 IC training credits)			
Semester 1 (18 credits + 1.5 IC)		**Semester 2 (16 credits + 4.5 IC)**	
Instrumentation and Automation Systems (ISE2002)	3	Service-Learning#	3
Integrated Design for Manufacture (ISE386)	3	Professional Communication in Chinese (CLC3241P)	2
Operations Research I (ISE3001)	3	Professional Communication in English for Engineering Students (ELC3531)	2
Planning of Production and Service Systems (ISE3002)	3	Engineering Management (ENG3003)	3
Materials and Processes Selection (ISE3006)	3	Business Process Management (ISE457)	3
Industrial Engineering Techniques and Methods (ISE318)	3	CAR A - Specially-designed with English Language^	3
-		Appreciation of Manufacturing Technologies (ISE2121)	3 IC
Integrated Project (ISE3103)	1.5 IC	Integrated Project (ISE3103) – cont'd	1.5 IC
Year 2 (30 academic credits)			
Semester 1 (15 credits)		**Semester 2 (15 credits)**	
Enterprise Resources Planning (ISE4004)	3	Total Quality Management (ISE404)	3
Society and the Engineer (ENG3004)	3	Engineering Costing and Evaluation (ISE431)	3
Project Management (ENG4001)	3	Robotics and Automation Systems (ISE4024)	3
Industrial Control Systems and Their Applications (ISE3019)	3	CAR M#	3
Individual Project (ISE4008)	3	Individual Project (ISE4008) – cont'd	3

* Those students not meeting the equivalent standard of the Undergraduate Degree LCR (based on their previous studies in AD/HD programme and their academic performance) will be required to take degree LCR subjects on top of the normal curriculum requirement. Degree LCR subjects include

TWO English language subjects

- Practical English for University Studies (ELC1011) 3 credits
- English for University Studies (ELC1012/1013) 3 credits
- Advanced English for University Studies (ELC2014) 3 credits

ONE Chinese language subject

- University Chinese (CLC1104C/P) 3 credits

Students are recommended to take these LCR subjects preferably in year one.

^ CAR A - Specially-designed with English Language should be completed within the first year.

General University Requirements (GUR) The pattern for GUR subjects are indicative only. Students may take these subjects according to their own schedule.

SECTION 5 - EXAMINATION AND ASSESSMENT

GENERAL ASSESSMENT REGULATIONS (GAR)

5.1 The University's General Assessment Regulations shall apply to the programmes. The specific assessment regulations are set out here, having been developed within the framework of the GAR.

ASSESSMENT METHODS

5.2 Students' performance in a subject can be assessed by continuous assessment and/or examinations, at the discretion of the individual subject offering Department. Where both continuous assessment and examinations are used, the weighting of each in the overall subject grade is clearly stated in Section 8 of this document. The subject offering Department can decide whether students are required to pass both the continuous assessment and examination components, or either components only, in order to obtain a subject pass, but this requirement (to pass both, or either, components) will be specified in Section 8 of this document. Learning outcome should be assessed by continuous assessment and/or examination appropriately, in line with the outcome-based approach.

5.3 Continuous assessment may include tests, assignments, projects, laboratory work, field exercises, presentations and other forms of classroom participation. Continuous Assessment assignments which involve group work should nevertheless include some individual components therein. The contribution made by each student in continuous assessment involving a group effort shall be determined and assessed separately, and this can result in different grades being awarded to students in the same group.

5.4 Assessment methods and parameters of subjects shall be determined by the subject offering Department.

GRADING

5.5 Assessment grades shall be awarded on a criterion-referenced basis. A student's overall performance in a subject shall be graded as follows:

Subject grade	***Grade point***	***Short description***	***Elaboration on subject grading description***
A+ A A-	4.3 4.0 3.7	Excellent	Demonstrates excellent achievement of intended subject learning outcomes by being able to skillfully use concepts and solve complex problems. Shows evidence of innovative and critical thinking in unfamiliar situations, and is able to express the synthesis or application of ideas in a logical and comprehensive manner.
B+ B B-	3.3 3.0 2.7	Good	Demonstrates good achievement of intended subject learning outcomes by being able to use appropriate concepts and solve problems. Shows the ability to analyse issues critically and make well-grounded judgements in familiar or standard situations, and is able to express the synthesis or application of ideas in a logical and comprehensive manner.

C+ C C-	2.3 2.0 1.7	Satisfactory	Demonstrates satisfactory achievement of intended subject learning outcomes by being able to solve relatively simple problems. Shows some capacity for analysis and making judgements in a variety of familiar and standard situations, and is able to express the synthesis or application of ideas in a manner that is generally logical but fragmented.
D+ D	1.3 1.0	Pass	Demonstrates marginal achievement of intended subject learning outcomes by being able to solve relatively simple problems. Can make basic comparisons, connections and judgments and express the ideas learnt in the subject, though there are frequent breakdowns in logic and clarity.
F	0.0	Fail	Demonstrates inadequate achievement of intended subject learning outcomes through a lack of knowledge and/or understanding of the subject matter. Evidence of analysis is often irrelevant or incomplete.

'F' is a subject failure grade, whilst all others ('D' to 'A+') are subject passing grades. No credit will be earned if a subject is failed.

Indicative descriptors for modifier grades

Main Grade (solid)	The student generally performed at this level, indicating mastery of the subject intended learning outcomes at this level.
+ (exemplary)	The student consistently performed at this level and exceeded the expectations of this level in some regards, but not enough to claim mastery at the next level.
- (marginal)	The student basically performed at this level, but the performance was inconsistent or fell slightly short in some regards.

Note: The above indicative descriptors for modifier grades are not applicable to the pass grades D and D+

5.6 At the end of a semester, a Grade Point Average (GPA) will be computed as follows, and based on the grade point of all the subjects:

$$\text{GPA} = \frac{\sum_{n=1}^{N} \text{Subject Grade Point}_n \times \text{Subject Credit Value}_n}{\sum_{n=1}^{N} \text{Subject Credit Value}_n}$$

where N = number of all subjects (inclusive of failed subjects) taken by the student up to and including the latest semester/term. For subjects which have been retaken, only the grade point obtained in the final attempt will be included in the GPA calculation.

5.7 Exempted, ungraded and incomplete subjects, subjects for which credit transfer has been approved without any grade assigned^, and subjects from which a student has been allowed to withdraw, i.e. those with the Grade "W" will be excluded from the GPA calculation. Subjects which have been given an "S" grade code i.e. absent from all assessment components, will be included in the GPA calculation and will be counted as "zero" grade point. The GPA is thus the unweighted cumulative average calculated for a student, for all relevant subjects taken from the start of the programme to a particular point of time. GPA is an indicator of overall performance, and ranges from 0.00 to 4.30 from 2020/21.

^ Subjects taken in PolyU or elsewhere and with grades assigned, and for which credit transfer has been approved, will be included in the GPA calculation.

DIFFERENT TYPES OF GPA

5.8 GPA will be calculated for each Semester including the Summer Term. This Semester GPA will be used to determine students' eligibility to progress to the next Semester alongside with the 'cumulative GPA'. However, the Semester GPA calculated for the Summer Term will not be used for this purpose, unless the Summer Term study is mandatory for all students of the programme concerned and constitutes part of the graduation requirements.

5.9 The GPA calculated after the second Semester of the students' study is therefore a 'cumulative' GPA of all the subjects taken so far by students, and without applying any level weighting.

5.10 Along with the 'cumulative' GPA, a weighted GPA will also be calculated, to give an indication to the Board of Examiners on the award classification which a student will likely get if he makes steady progress on his/her academic studies. GUR subjects will be included in the calculation of weighted GPA for all programmes.

5.11 When a student has satisfied the requirements for award, an award GPA will be calculated to determine his/her award classification. GUR subjects will be included in the calculation of award GPA for all programmes.

5.12 For students taking the Major/Minor study route, a separate GPA will be calculated for their Major and Minor programmes. The Major GPA will be used to determine his/her award classification, which will be so reflected on the award parchment. The Minor GPA can be used as a reference for Board of Examiners to moderate the award classification for the Major.

5.13 For students taking the Major/Secondary Major study route, there is no separate "Secondary Major GPA". The Major GPA is the weighted GPA of all subjects contributing to the Major and Secondary Major.

ASSESSMENT OF INDUSTRIAL CENTRE TRAINING

5.14 An assessment panel (Industrial Centre Training) assesses the performance of students during the IC training period.

5.15 Industrial Centre Training is given a training credit value equivalent to one credit for each week spent on such training, this being equivalent to about 35 hours of study (including hours spent on private study). Accordingly, a 10-week equivalent of industrial training generates a total of 10 training credits. The typical schedule of IC Training is as follows:

Subject Description	Duration & Semester
Engineering Communication and Fundamentals (ISE2105) (4 training credits)	4 weeks, during semester 1 & 2 of Year 1
Appreciation of Manufacturing Technologies (ISE2121) (3 training credits)	3 weeks, during the semester 2 of Year 2
Integrated Project (ISE3103) (3 training credits)	3 weeks, during the semester 1 & semester 2 of Year 3

Subject 1 will be graded at the time when an assessment is made. Only ONE aggregate grade is given to sum up the performance of the student in this subject at the end of semester 2. Assessment for Subjects 2 and 3 are made at the end of semester 2 of year 2 and 3 respectively.

ASSESSMENT OF THE WORK INTEGRATED EDUCATION (WIE)

5.16 The Programme uses Engineering Faculty Guidelines for assessment of WIE. WIE components will NOT be counted towards GPA calculation. Students are required to complete a minimum of 2 weeks/80 hours of full-time training or equivalent. WIE required in the form of Summer Placement or other training may take place in Hong Kong, Mainland China, or overseas. WIE activities may be organised through the Department, the Careers and Placement Section (CPS) of the Student Affairs Office (SAO) or by the student's own initiative with advice from the WIE coordinator to ensure that they qualify for WIE on account of relevance, structure, and measurability. In such cases, assessment will be made using the WIE log book. The log book must be signed by the employer with a brief evaluation of the student, as appropriate. This is examined by the WIE coordinator to ensure that the WIE objectives have been achieved. The WIE coordinator may interview the student in making the evaluation.

PROGRESSION/ACADEMIC PROBATION/DEREGISTRATION

5.17 The Board of Examiners shall, at the end of each semester (except for Summer Term unless there are students who are eligible to graduate after completion of Summer Term subjects or the Summer Term study is mandatory for the programme), determine whether each student is:

(i) eligible for progression towards an award; or

(ii) eligible for an award; or

(iii) required to be de-registered from the programme.

When a student has a Grade Point Average (GPA) lower than 1.70, he/she will be put on academic probation in the following semester. Once when a student is able to pull his/her GPA up to 1.70 or above at the end of the semester, the status of "academic probation" will be lifted. The status of "academic probation" will be reflected in the examination result notification but not in transcript of studies.

5.18 A student will have 'progressing' status unless he/she falls within any one of the following categories which may be regarded as grounds for de-registration from the programme:

(i) the student has reached the final year of the normal period of registration for that programme, as specified in this document, unless approval has been given for extension; or

(ii) the student has reached the maximum number of retakes allowed for a failed compulsory subject; or

(iii) the student's GPA is lower than 1.70 for two consecutive semesters and his/her Semester GPA in the second semester is also lower than 1.70; or

(iv) the student's GPA is lower than 1.70 for three consecutive semesters.

When a student falls within any of the categories as stipulated above, except for category (i) with approval for extension, the Board of Examiners shall de-register the student from the programme without exception.

A student may be deregistered from the programme enrolled before the time frame specified in (ii) or (iii) above if his/her academic performance is poor to the extent that the Board of Examiners considers that there is not much of chance for him/her to attain a GPA of 1.70 at the end of the programme.

If the student is not satisfied with the de-registration decision of the Board of Examiners, he/she can lodge an appeal. All such appeal cases will be referred directly to Academic Appeals Committee (AAC) for final decision. Views of Faculties/Department will be sought and made available to AAC for reference.

UNIVERSITY GRADUATION REQUIREMENTS

For Normal Students

5.19 A student is eligible for award if he/she satisfies all the conditions listed below:

(i) Complete successfully an accumulation of 124 academic credits + 10 IC training credits for the award[#];

(ii) Earn a cumulative GPA of 1.70 or above at graduation;

(iii) Complete successfully the mandatory Work-Integrated Education (WIE) component;

(iv) Satisfy 30 credits of General University Requirements (GUR);

(a) Language and Communication Requirements[~]	9 credits
(b) AIDA Requirement	2 credits
(c) IE Requirement	1 credit
(d) Leadership Education and Development	3 credits
(e) Service-Learning	3 credits
(f) Cluster Areas Requirement (CAR) [3 credits from each of the 4 cluster areas]	12 credits
(g) Healthy Lifestyle[@]	Non-credit bearing
	Total = 30 credits

[#] This minimum only applies to students who are admitted through the normal route.

[~] Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from the DSR - Chinese and CAR - Chinese Reading and Writing requirements. However, this group of students would still be required to take one Chinese LCR subject to fulfil their Chinese LCR.

[@] Students admitted to the programmes as Senior Year Intakes are not required to take the Healthy Lifestyle Programme. Advanced Standing students are required to take the Healthy Lifestyle Programme (except for those who are HD/AD holders who follow the Senior/Articulation Degree programme GUR curriculum).

(v) Satisfy the residential requirement for at least 1/3 of the credits to be completed for the award he/she is currently enrolled in PolyU;

(vi) Satisfy the National Education (NE) requirement; and

(vii) Satisfy any other requirements as specified in this document and as specified by the University.

For Senior Year Students

5.20 A student is eligible for award if he/she satisfies all the conditions listed below:

(i) Complete successfully an accumulation of 64 academic credits* + 6 IC training credits for the award;

(ii) Earn a cumulative GPA of 1.70 or above at graduation;

(iii) Complete successfully the mandatory Work-Integrated Education (WIE) component;

(iv) Satisfy the following GUR requirements;

(a) Cluster Areas Requirement (CAR) [3 credits from CAR(A)^ and 3 credits from CAR(M)]	6 credits
(b) Service-Learning	3 credits
(c) Essential Components of General Education@	Non-credit bearing
	Total = 9 credits

*Those students not meeting the equivalent standard of the Undergraduate Degree LCR (based on their previous studies in AD/HD programme and their academic performance) will be required to take degree LCR subjects on top of the normal curriculum requirement. Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from the DSR - Chinese and CAR - Chinese Reading and Writing requirements. However, this group of students would still be required to take one Chinese LCR subject to fulfil their Chinese LCR.

^Students are required to take a specially designed CAR(A) – English Language Subject with embedded English Reading and Writing Requirements.

@The Essential Components of General Education includes four modules namely Academic Integrity; AI and Data Analytics; Innovation and Entrepreneurship; and National Education.

(v) Satisfy the residential requirement for at least 1/3 of the credits to be completed for the award he/she is currently enrolled in PolyU; and

(vi) Satisfy any other requirements as specified in this document and as specified by the University.

5.21 There are subjects which are designed to fulfil the credit requirement of different types of subject. Students passing these subjects will be regarded as having fulfilled the credit requirements of the particular types of subject concerned. Nevertheless, the subject passed will only be counted once in fulfilling the credit requirements of the award, and the students will be required to take another subject in order to meet the total credit requirement of the programme concerned.

5.22 Remedial subjects are designed for new students who are in need of additional preparations in a particular subject area, and only identified students of a programme are required to take these subjects. These subjects should therefore be counted outside the regular credit requirement for award.

5.23 In addition, students may be required to take subjects that are designed to enhance their skills in particular subject areas to underpin their further advanced study in the discipline. These underpinning subjects could be of different subject areas (e.g. Mathematics, science subjects), and the number of credits each student is required to take in a particular underpinning subject area may vary according to the different academic backgrounds of the students.

5.24 Senior Year intakes admitted to the 4-year Undergraduate Degree programmes on the strength of the Associate Degree/Higher Diploma qualifications are required to complete at least 60 credits in order to be eligible for a Bachelor's degree. Exemption may be given from subjects already taken in the previous Associate Degree/Higher Diploma studies. In that case, students should take other electives (including free electives) instead to make up the total of 60 credits required.

5.25 Level-0 subjects and training subjects (including clinical/field training) will not be counted to fulfill free elective requirement for graduation purpose.

5.26 A student is required to graduate as soon as he/she satisfies the graduation requirements as stipulated in 5.19 and 5.20 above. The student concerned is required to apply for graduation, in the semester in which he/she is able to fulfil all his/her graduation requirements, and after the add/drop period for that semester has ended.

STUDENTS TAKING THE MAJOR/MINOR OPTION

5.27 Students taking the Major/Minor option will be considered for an award when they have satisfied the requirements for both the Major and Minor studies (i.e. having a GPA of 1.70 or above) and have also submitted an application for graduation. If the 18 credits taken for the approved Minor study can meet the requirements for that Minor, the Major students may apply to graduate with a specific Minor, in addition to their Major. Otherwise, students will graduate with a Major only.

5.28 Subject to the approval by the Minor-offering Department, students may count up to 6 credits from their Major/GUR [including Language Communication Requirements (LCR) subjects at proficiency level] towards their chosen Minor. Nevertheless, students must take at least 6 credits from their chosen Minor programme in order to satisfy the residential requirement of their chosen Minor. In addition, to be eligible for the Major and Minor awards, the total number of credits taken by the students for their Major-Minor studies must not be lower than the credit requirement of the single discipline Major programme.

STUDENTS TAKING THE MAJOR/SECONDARY MAJOR OPTION

5.29 Students may count up to 12 credits of their Major/GUR subjects towards the Secondary Major. Nevertheless, students must take at least 12 credits from their chosen Secondary Major in order to satisfy the residential requirement of the chosen Secondary Major. Students who have completed more than 12 credits of subjects that are eligible for double counting will need to apply for graduation and indicate the subjects intended for double counting. Notwithstanding the above, students must meet the minimum credit requirements of the "X + Secondary Major" concerned, i.e. 132 credits.

STUDENTS TAKING THE DOUBLE MAJOR OPTION

5.30 Students are required to obtain an overall GPA of at least 1.70, in order to satisfy the requirement for graduation with Double Major. They will not be allowed to graduate with one of the 2 Majors. The total credit requirement of Double Major will depend on the degree of commonality between the two Majors. Apart from the 30 credits of GUR subjects, up to 1/3 of the DSR of the first Major which are common to the second Major can be double-counted towards the second Major.

GUIDELINES FOR AWARD CLASSIFICATION

5.31 To help the Board of Examiners in arriving at award classification decisions, a weighted GPA will be computed for each student upon completion of the programme. The Weighted GPA will be computed as follows:

$$\text{Weighted GPA} = \frac{\sum_{n=1}^{N} \text{Subject Grade Point}_n \times \text{Subject Credit Value}_n \times W_n}{\sum_{n=1}^{N} \text{Subject Credit Value}_n \times W_n}$$

where Wn = weighting to be assigned according to the level of the subject

N = number of all subjects counted in GPA calculation as set out in paragraph 5.6, except those exclusions specified in paragraph 5.33 below.

For calculating the weighted GPA (and award GPA) to determine the Honours classification of students who satisfy the graduation requirements of Bachelor's degree awards, a University-wide standard weighting will be applied to all subjects of the same level, with a weighting of 2 for Level 1 and 2 subjects, a weighting of 3 for Level 3 and 4 subjects. Same as for GPA, weighted GPA ranges from 0.00 to 4.30 from 2020/21.

5.32 The contribution of each subject towards the weighted GPA depends on the product of the credits assigned and the level weighting. The weighted GPA will be used as one of the factors to be considered by the Board of Examiners in the determination of the award classifications.

5.33 Any subjects passed after the graduation requirement has been met or subjects taken on top of the prescribed credit requirements for award shall not be taken into account in the grade point calculation for award classification. However, if a student attempts more elective subjects (or optional subjects) than those required for graduation in or before the semester in which he/she becomes eligible for award, the elective subjects (or optional subjects), except for subjects which are selected by students to fulfill the free electives requirement for graduation, with a higher grade/contribution shall be included in the grade point calculation (i.e. the excessive subjects attempted with a lower grade/contribution, including failed subjects, will be excluded).

STUDENTS TAKING THE MAJOR (INCLUDING THE MAJOR/SECONDARY MAJOR OPTION)/MINOR STUDIES

5.34 For students who have completed a Major (including the Major/Secondary Major option)/Minor programme, a single classification will be awarded and their award classification will mainly be based on the "Major GPA", but it can be moderated by the Board of Examiners with reference to the "Minor GPA". For students who have completed a Major programme combined with free electives, their award classification will be determined by their "Major GPA" which includes grades obtained for the free electives, if appropriate.

5.35 "Major GPA" is derived based on all subjects of the Major programme, as well as the Secondary Major programme, if any, including those meeting the mandatory General University Requirements (GUR) and programme-specific language requirement, but not necessarily including the training credits.

5.36 "Minor GPA" is derived based on the 18 credits of specific Minor programme. "Minor GPA" is unweighted.

5.37 The "Major GPA" and the "Minor GPA" will be presented separately to the Board of Examiners for consideration. The guidelines for determining award classification applicable to programmes with Major (including the Major/Secondary Major option)/Minor studies.

5.38 Where a student has a high GPA for his/her Major (including the Major/Secondary Major option) but a lower GPA for his/her Minor, he/she will not be 'penalised' in respect of his/her award classification, which is attached to the Major. On the other hand, if a student has a lower GPA for his/her Major (including the Major/Secondary Major option) than his/her GPA for the Minor, the Board of Examiners may consider recommending a higher award classification for the student for ratification by the APRC via the Faculty Board.

STUDENTS TAKING THE DOUBLE MAJOR OPTION

5.39 The derivation of GPA for award classification for the First Major and Second Major (particularly on the counting of subjects common to both Majors) will be decided by the Department offering the Major programme. Students will be given two award parchments, one for each Major programme, which will be issued upon completion of both Majors. The honours classification of the two Major awards need not be identical.

CLASSIFICATION OF AWARDS

5.40 The following are the award GPA ranges for determining award classifications:

Honours degrees	Guidelines
1st Class Honours	The student's performance/attainment is **outstanding**, and identifies him/her as **exceptionally able** in the field covered by the programme in question.
2nd Class Honours (Division 1)	The student has reached a standard of performance/attainment which is **more than satisfactory** but **less than outstanding**.
2nd Class Honours (Division 2)	The student has reached a standard of performance/attainment judged to be **satisfactory, and clearly higher than the 'essential minimum' required for graduation**.
Third Class Honours	The student has attained the **'essential minimum'** required for graduation at a standard ranging from **just adequate to just satisfactory.**

5.41 Under exceptional circumstances, a student who has completed an Honours degree programme, but has not attained Honours standard, may be awarded a Pass-without-Honours degree. A Pass-without-Honours degree award will be recommended, when the student has demonstrated a level of final attainment which is below the 'essential minimum' required for graduation with Honours from the programme in question, but when he/she has nonetheless covered the prescribed work of the programmes in an adequate fashion, while failing to show sufficient evidence of the intellectual calibre expected of Honours degree graduates.

5.42 Students who have committed academic dishonesty or non-compliance with examination regulations will be subject to the penalty of the lowering of award classification by one level. For undergraduate students who should be awarded a Third class Honours degree, they will be

downgraded to a Pass-without-Honours. The minimum of downgraded overall result will be kept at a Pass. In rare circumstances where both the Student Discipline Committee and Board of Examiners of a department consider that there are strong justifications showing the offence be less serious, the requirement for lowering the award classification can be waived.

5.43 The following tables may also be used as a reference for the Board of Examiners in determining award classifications:

Award Classification	Award GPA
1st Class Honours	3.60 to 4.30
2nd Class Honours (Division 1)	3.00 to 3.59
2nd Class Honours (Division 2)	2.40 to 2.99
Third Class Honours	1.70 to 2.39

5.44 Decisions by the Boards of Examiners on award classifications to be granted to each student on completion of the programme shall be ratified by the Faculty Board (of Examiners). For cases the decisions of which do not conform to the above indicative GPA range, they should be referred, by the Faculty Board (of Examiners), to the APRC for ratification.

VALIDITY OF CREDITS

5.45 The validity period of credits earned is eight years from the year of attainment, i.e. the year in which the subject is completed. Credits earned from previous studies should remain valid at the time when the student applies for credit transfer.

RETAKING OF SUBJECTS

5.46 Students may only retake a subject which they have failed (i.e. Grade F or S or U). Retaking of subjects is with the condition that the maximum study load of 21 credits per semester is not exceeded. The number of retakes of a subject should be restricted to two, i.e. a maximum of three attempts for each subject is allowed.

5.47 In cases where a student takes another subject to replace a failed elective subject, the fail grade will be taken into account in the calculation of the GPA, despite the passing of the replacement subject. Likewise, students who fail a Cluster Area Requirement (CAR) subject may need to take another subject from the same Cluster Area in order to fulfill this part of the GUR, since the original CAR subject may not be offered; in such cases, the fail grade for the first CAR subject will be taken into account in the calculation of the GPA, despite the passing of the second CAR subject.

5.48 Students need to submit a request to the Faculty Board for the second retake of a failed subject.

5.49 Students who have failed a compulsory subject after two retakes and have been de-registered can submit an appeal to the Academic Appeals Committee (AAC) for a third chance of retaking the subject.

5.50 In relation to 5.49 above, in case AAC does not approve further retaking of a failed compulsory subject or the taking of an equivalent subject with special approval from the Faculty, the student concerned would be de-registered and the decision of the AAC shall be final within the University.

ABSENCE FROM AN ASSESSMENT COMPONENT

5.51 If a student is unable to complete all the assessment components of a subject, due to illness or other circumstances which are beyond his/her control and considered by the subject offering department as legitimate, the Department will determine whether the student will have to complete a late assessment and, if so, by what means. This late assessment shall take place at the earliest opportunity, and normally before the commencement of the following academic year (except that for Summer Term, which may take place within 3 weeks after the finalisation of Summer Term results). If the late assessment cannot be completed normally before the commencement of the following academic year, the Faculty Board Chairman shall decide on an appropriate time for completion of the late assessment.

5.52 The student concerned is required to submit his/her application for late assessment in writing to the Head of Department offering the subject, with five working days from the date of the examination, together with any supporting documents. Approval of applications for late assessment and the means for such late assessments shall be given by the Head of Department offering the subject or the Subject Lecturer concerned, in consultation with the Programme Leader.

ASSESSMENT TO BE COMPLETED

5.53 For cases where students fail marginally in one of the components within a subject, the BoE can defer making a final decision until the students concerned have completed the necessary remedial work to the satisfaction of the subject examiner(s). The remedial work must not take the form of re-examination.

AEGROTAT AWARD

5.54 If a student is unable to complete the requirements of the programme in question the award, due to very serious illness, or other very special circumstances which are beyond his/her control, and are considered by the Board of Examiners as legitimate, the Faculty Board will determine whether the student will be granted aegrotat award. Aegrotat award will be granted under very exceptional circumstances.

5.55 A student who has been offered an aegrotat award shall have the right to opt either to accept such an award or request to be assessed on another occasion as stipulated by the Board of Examiners, the student's exercise of this option shall be irrevocable. The acceptance of an aegrotat award by a student shall disqualify him/her from any subsequent assessment for the same award. An aegrotat award shall normally not be classified, and the award parchment shall not state that it is an aegrotat award. However, the Board of Examiners may determine whether the award should be classified provided they have adequate information on the students' academic performance.

OTHER PARTICULAR CIRCUMSTANCES

5.56 A student's particular circumstances may influence the procedures for assessment but not the standard of performance expected in assessment.

RECORDING OF DISCIPLINARY ACTIONS IN STUDENTS' RECORDS

5.57 With effect from Semester One of 2015/16, disciplinary actions against students' misconducts will be recorded in students' records.

5.58 Students who are found guilty of academic dishonesty or non-compliance with examination regulations will be subject to the penalty of having the subject result concerned disqualified and be given a failure grade with a remark denoting 'Disqualification of result due to academic dishonesty/ non-compliance with examination regulations'. The remark will be shown in the students' record as well as the assessment result notification and transcript of studies, until their leaving the University.

5.59 Students who have committed disciplinary offences (covering both academic and non-academic related matters) will be put on 'disciplinary probation'. The status of 'disciplinary probation' will be shown in the students' record as well as the assessment result notification, transcript of studies and testimonial during the probation period, until their leaving the University. The disciplinary probation is normally one year unless otherwise decided by the Student Discipline Committee.

5.60 The University reserves the right to withhold the issuance of any certificate of study to a student/graduand who has unsettled matters with the University, or is subject to disciplinary action.

SECTION 6 - PROGRAMME OPERATION AND CONTROL

FREQUENCY OF SUBJECTS TO BE OFFERED

6.1 Subjects are normally offered once a year. There are however, several common subjects shared by other programmes in the PolyU which may be available in both Semester's 1 and 2. Subject to the availability of resources, the Department will attempt to offer as many subjects as possible in both semesters.

DAYTIME, EVENING AND SUMMER TEACHING

6.2 Most of the subjects listed in the programme will be offered in the daytime and evening. Usually, there will be no summer term teaching (with the exception of IC training at the Industrial Centre or LCR/CAR/SL subjects), subjects will only be offered in Semester's 1 and 2.

SUBJECT REGISTRATION AND WITHDRAWAL

6.3 In addition to programme registration, students need to register for the subjects at specified periods prior to the commencement of the semester. Students may apply for withdrawal of their registration on a subject after the add/drop period if they have a genuine need to do so. The application should be made to the relevant programme offering Department and will require the approval of both the subject lecturer and the Programme Leader concerned. Application submitted after the commencement of the examination period will not be considered. For approved applications of subject withdrawal, the tuition fee paid for the subject will be forfeited and the withdrawal status of the subject will be shown in the examination result notification and transcript of studies but will not be counted towards the calculation of GPA.

STUDY LOAD

6.4 For students following the progression pattern specified for their programme, they have to take the number of credits and subjects, as specified in this document, for each semester. Students cannot drop those subjects assigned by the Department unless prior approval has been given by the Department.

6.5 The normal study load is 15 credits in a semester for full-time study. The maximum study load to be taken by a student in a semester is 21 credits, unless exceptional approval is given by the Head of the programme offering Department. For such cases, students should be reminded that the study load approved should not be taken as grounds for academic appeal.

6.6 To help improve the academic performance of students on academic probation, these students will be required to take a reduced study load in the following semester (Summer Term excluded). The maximum number of credits to be taken by the students varies according to the policies of individual Departments and will be subject to the approval of the authorities concerned.

6.7 Students are not allowed to take zero subject in any semester, including the mandatory summer term as required by some programmes, unless they have obtained prior approval from the programme offering Department; otherwise they will be classified as having unofficially withdrawn from their programme. Students who have been approved for zero subject enrolment (i.e. taking zero subject in a semester) are allowed to retain their student status and

continue using campus facilities and library facilities. Any semesters in which students are allowed zero subjects will be counted towards the total period of registration.

SUBJECT EXEMPTION

6.8 Students may be exempted from taking any specified subjects, including mandatory General University Requirements (GUR) subjects, if they have successfully completed similar subjects previously in another programme or have demonstrated the level of proficiency/ability to the satisfaction of the subject offering Department. Subject exemption is normally decided by the subject offering Department. However, for applications which are submitted by students who have completed an approved student exchange programme, the subject exemption is to be decided by the programme offering Department in consultation with the subject offering Departments. In case of disagreement between the programme offering Department and the subject offering Department, the two Faculty Deans/School Board Chairmen concerned will make a final decision jointly on the application. If students are exempted from taking a specified subject, the credits associated with the exempted subject will not be counted towards meeting the award requirements (except for exemptions granted at admission stage). It will therefore be necessary for the students to consult the programme offering Department and take another subject in order to satisfy the credit requirement for the award.

CREDIT TRANSFER

6.9 Students may be given credits for recognised previous studies including mandatory General University Requirements (GUR) subjects; and the credits will be counted towards meeting the requirements for award. Transferred credits may not normally be counted towards more than one award. The granting of credit transfer is a matter of academic judgment.

6.10 Credit transfer may be done with or without the grade being carried over; the former should normally be used when the credits were gained from PolyU. Credit transfer with the grade being carried over may be granted for subjects taken from outside the University, if deemed appropriate, and with due consideration to the academic equivalence of the subjects concerned and the comparability of the grading systems adopted by the University and the other approved institutions. Subject credit transfer is normally decided by the subject offering Department. However, for applications which are submitted by students who have completed an approved student exchange programme, the decision will be made by the programme offering Department in consultation with the subject offering Departments.

6.11 The validity period of credits previously earned is up to 8 years after the year of attainment.

6.12 Normally, not more than 50% of the credit requirement for award may be transferable from approved institutions outside the University. For transfer of credits from programmes offered by PolyU, normally not more than 67% of the credit requirement for award can be transferred. In cases where both types of credits are being transferred (i.e. from programmes offered by PolyU and from approved institutions outside the University), not more than 50% of the credit requirement for award may be transferred. For students admitted to an Articulation Degree or Senior Year curriculum which is already a reduced curriculum, they should not be given credit transfer for any required GUR subjects, and are required to complete at least 60 credits in order to be eligible for a Bachelor's award.

6.13 If a student is waived from a particular stage of study on the basis of advanced qualifications held at the time of admission, the student concerned will be required to complete fewer credits for award. For these students, the 'deducted' credits at admission stage will be counted towards the maximum limit for credit transfer when students apply for further credit transfer

after their admission. This also applies to students admitted to an Articulation Degree or Senior Year curriculum when they claim further credit transfer after admission.

6.14 Credit transfer can be applicable to credits earned by students through study at an overseas institution under an approved exchange programme. Students should, before they go abroad for the exchange programme, seek prior approval from the programme offering Department (who will consult the subject offering Departments as appropriate) on their study plan and credit transferability.

6.15 All credit transfers approved will take effect only in the semester for which they are approved. A student who applies for transfer of credits during the re-enrolment or the add/drop period of a particular semester will only be eligible for graduation at the end of that semester, even if the granting of credit transfer will immediately enable the student to satisfy the credit requirement for the award.

6.16 Regarding credit transfer for GUR subjects, the Programme Host Department is the approval authority at the time of admission to determine the number of GUR credits which an Advanced Standing student will be required to complete for the award concerned. Programme Host Departments should make reference to the mapping lists of GUR subjects, compiled by the Committee on General University Requirements (CoGUR), on the eligibility of the subjects which can qualify as GUR subjects. Applications for credit transfer of GUR subjects after admission will be considered, on a case-by-case basis, by the Subject Offering Department or Office of Undergraduate Studies (OUS)/Service-Learning and Leadership Office (SLLO), in consultation with the relevant Sub-committee(s) under CoGUR, as appropriate.

6.17 For credit transfer of retaken subjects, the grade attained in the last attempt should be taken in the case of credit transfer with grade being carried over. Students applying for credit transfer for a subject taken in other institutions are required to declare that the subject grade used for claiming credit transfer was attained in the last attempt of the subject in their previous studies. If a student fails in the last attempt of a retaken subject, no credit transfer should be granted, despite the fact that the student may have attained a pass grade for the subject in the earlier attempts.

6.18 Students should not be granted credit transfer for a subject which they have attempted and failed in their current study unless the subject was taken by the student as an exchange-out student in his current programme.

DEFERMENT OF STUDY

6.19 Students may apply for deferment of study if they have a genuine need to do so such as illness or posting to work outside Hong Kong. Approval from the Department is required. The deferment period will not count towards total period of registration.

6.20 Application for deferment of study from students who have not yet completed the first year of a full-time programme will only be considered in exceptional circumstances.

6.21 Where the period of deferment of study begins during a stage for which fees have been paid, no refund of such fees will be made.

6.22 Students who have been approved for deferment are not entitled to enjoy any campus facilities during the deferment period.

NORMAL DURATION FOR COMPLETION OF THE PROGRAMME

6.23 Students should complete the programme within the normal duration of the programme as specified in the Programme Requirement Document. Those who exceed the normal duration of the programme will be de-registered from the programme unless prior approval has been obtained from relevant authorities. The study period of a student shall exclude deferment granted for justifiable reasons, and the semester(s) when the student has been approved to undertake internship. Any semester in which the students are allowed to take zero subject will be counted towards their total period of registration.

6.24 Students who have been registered for the normal duration of the programme may request extension of their studies for up to one year with the approval of the relevant Heads of Department. Applications for extension of study period beyond one year and up to two years will require the approval from Faculty Board Chairman.

6.25 Students who have exceeded the normal duration of the programme for more than two years and have been de-registered can submit an appeal to the Academic Appeals Committee to request further extension. If the appeal fails, the student shall be de-registered.

DEPARTMENTAL UNDERGRADUATE PROGRAMME COMMITTEE

6.26 The Head of Department can decide on the composition of the Departmental Undergraduate Programme Committee. The Departmental Undergraduate Programme Committee will meet at least twice a year, and additionally at the request of the Chairman or of one-third of its membership or of the Chairman of the Faculty/School/College Board. It will exercise the overall academic and operational responsibility for the programme and its development within defined policies, procedures and regulations.

The Committee will be specifically responsible for the following:

(i) the effective operation, organisation and development of the programme;

(ii) implementation of University learning and teaching policies and strategies in the context of academic programmes and identification of areas for enhancement, in collaboration with the Departmental Learning and Teaching Committee (DLTC);

(iii) review of academic regulations, admission policy, assessment and examination methods;

(iv) submissions of proposals to appropriate professional bodies and external validating bodies, normally via the Head of the host Department and in accord with the University's established procedures;

(v) the continuing critical review of the rationale, aims, intended learning outcomes (ILOs) and the alignment of teaching, learning and assessment with the ILOs, programme learning outcomes assessment and its results, and the improvement and development of the programme(s); including the approval of minor changes to the curricula of the programmes;

(vi) definition and maintenance of the programme's academic standard;

(vii) ensuring that the views of students, as reflected by the Student/ Staff Consultative Group(s) or additional means as decided by DPC, and other key stakeholders on the programme are known and taken into account;

(viii) the coordination of the programme review procedures and the submission of the Annual Programme Review reports, including the Departmental Overview report.

PROGRAMME LEADER

6.27 A Programme Leader will normally be a member of the programme offering Department and be appointed by the Head of Department. The appointment will be subject to the confirmation by the Chairman of the appropriate Faculty Board. In the unavoidable absence of a Programme Leader, an acting Programme Leader will be appointed by the Head of the programme offering Department. A Programme Leader is accountable in day-to-day operational terms to the Head of Department; and will normally hold office for a full cycle of the programme, but can then be considered for re-nomination. The Programme Leader will provide the academic and organizational leadership for the programme.

PROGRAMME EXECUTIVE GROUP

6.28 For programmes which are substantial, e.g. in scale, in the range of subjects or complexity, a small Programme Executive Group, would normally manage the day-to-day operation of the programme within the agreed scheme. The Group would operate informally, be organized by the Programme Leader and typically include staff with key programme responsibilities. For relatively simple programmes, the Programme Leaders would manage the day-to-day operation of the programmes.

THEME GROUP LEADERS

6.29 Theme Group Leaders are senior members of academic staff appointed by the Head of Department. They are responsible for the activities and development of subjects within a theme group which are part of the curricula of the programmes offered by the Department.

ACADEMIC ADVISOR

6.30 All full-time undergraduate students (including those admitted to Articulation Programmes or Senior Year Places) will be assigned to one full-time academic staff (normally at the Lecturer grade or above) from his/her Major Department who will act as his/her academic advisor throughout his/her course of study at PolyU.

6.31 The main responsibilities of the academic advisor will include:

- Building rapport with the student, serving as a bridge that connects them to the Department,
- Being accessible and available to students, and responding to their questions and concerns,
- Helping students to consider and clarify their intellectual, professional and personal goals,
- Helping students to develop an appropriate study plan (particular with regard to their Major), and assisting in their selection of appropriate courses to achieve their identified goals,
- Clarifying to students academic regulations and requirements, particularly those relating to the Major,
- Identifying students with special learning needs or early signs of learning problem, and referring/encouraging them to seek help or support.

6.32 Academic advisors are expected to keep in contact with their student advisees regularly (e.g., via emails or other means), and to have at least one face-to-face meeting with them, either individual or in small groups, during the academic year. Advising via electronic means (such as Skype for Business, ZOOM or Teams) with strict observance of the principle of confidentiality as a form of formal academic advising meetings is recognized to be reported in the Academic Advising (AA) Report. Student advisees are expected to consult their respective advisors on their study plan before subject registration.

6.33 Effective academic advising requires an active participation of student advisees in the processes. It is important that students understand it is their responsibilities to:

- Understand the academic regulations and requirements of their chosen programme of study and/or its Major, as well as the GUR requirements,
- Actively obtain information, and seek out advisors and resources on a regular basis and as needed,
- Take the final responsibility for making decisions and choices regarding their academic study based on the information and advice given.

STUDENT/STAFF CONSULTATIVE GROUP

6.34 The importance of assessing students' opinion on the organisation and running of the programme on a continual basis is recognised and formal arrangements for this purpose are in place. Student membership should include all years of study under the normal progression pattern and an appropriate mix of major student groupings and staff membership should cover all the main subject areas and activities of the programme. The HoD, or a senior member of the Department, may chair the Group. The Group is to discuss any matters directly related to the programme, and to report or make recommendations, as deemed necessary, to the Departmental Undergraduate Programme Committee. Meetings are usually held once per semester.

6.35 It is important that students do not perceive meetings of the Group as the only or main channel for dealing with student problems and complaints accumulated since the last meeting. Such matters would be dealt with when they occurred, through the Programme Leader or other appropriate staff. This would allow meetings of the Group to be used for constructive discussion of the programme in general, of the demands of the programme on students, and of possible improvement.

SECTION 7 - PROGRAMME EVALUATION AND DEVELOPMENT

7.1 The programme evaluation and development procedures are intended to assess the:

(i) extent to which the aims and objectives are being met and what measures need to be taken to remedy any deficiencies identified, and

(ii) continuing relevance of the aims and subject objectives and the ways they need to be modified to take account of technological change and the development of Hong Kong's industries.

7.2 The programme evaluation procedures are conducted at two levels: firstly at the Programme Executive Group/Departmental Undergraduate Programme Committee level continuously through the year and secondly to the Departmental Undergraduate Programme Committee/Departmental Academic Advisor level at the end of each year. The first level is described in Section 6 of this document and the other below.

7.3 The Departmental Undergraduate Programme Committee holds its Annual Programme Review Meeting each year after the Board of Examiner has met as described in Section 5 of this document. The issues described in Section 6 are considered, particularly as revealed by the examination performance, and recommendations for action are made to remedy any deficiencies identified. Following the Annual Programme Review Meeting the Programme Leader submits the Annual Programme Review Report (which is encapsulated as part of the Annual Operation Plan) to the Engineering Faculty Board each year which, for the previous academic year,

(i) summarises the operation of the programme,

(ii) lists any modifications that are deemed necessary, and

(iii) makes proposals for substantial changes to the structure or content of the programme, or for changes with significant resource implications.

7.4 The Departmental Undergraduate Programme Committee adopts a policy of continuous improvement and is continuously evaluating the effectiveness and relevance of the Programme. This policy of continuous improvement includes soliciting the views of the Department's Advisory Committee, local industrialists, past graduates and the Departmental Academic Advisor.

7.5 The Programme is subject to an evaluation, normally every six years, as part of the PolyU's Departmental Review exercise. This is external to the Department and makes a critical appraisal of the standing, progress and future of all programmes that a department operates. The policy of continuous improvement as mentioned 7.4 attempts to render a major in-depth programme appraisal unnecessary prior to a Departmental Review.

SECTION 8 - SUBJECT SYLLABUSES AND PROJECTS

8.1 Syllabuses for all subjects and projects of the programme are listed in Table 8. Department of Industrial and Systems Engineering subjects are listed first, followed by subjects serviced by other departments. The subject coordinators for the ISE subjects will be updated regularly. Please access the departmental website https://www.polyu.edu.hk/ise/current-students/programme-related-info/subject-syllabus for the updated list.

TABLE 8 - SYLLABUS INDEX

TABLE 8 - SYLLABUS INDEX CONTINUED

Subjects offered by
Department of Industrial and Systems Engineering

Subject Description Form

Subject Code	ISE1001
Subject Title	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life
Credit Value	2
Level	1
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. the basic concepts and knowledge of artificial intelligence and data analytics (AIDA); 2. the appreciation of AIDA applications in addressing efficiency and effectiveness in daily life; and 3. the basic knowledge and skills to develop simple AIDA tools for real life applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. Demonstrate an understanding of the foundational concepts of AIDA; b. Acquire basic skills in using AIDA technologies and applications; c. Articulate examples of how the adoption of AIDA could enhance their studies in the ISE discipline; d. Demonstrate an awareness of global contemporary ethical issues and impact from AIDA applications in daily life.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Industrial and Systems Engineering (ISE) and AIDA</u> Contributions of ISE; Efficiency and Effectiveness; Operations improvement; Business competitiveness; Examples of AIDA; Relation between Artificial Intelligence and Data Analytics 2. <u>Introduction to Artificial Intelligence</u> Concept of Artificial intelligence; Machine learning; Learning process; Supervised learning, Unsupervised learning; Reinforcement learning;

Artificial Intelligence for operations efficiency and effectiveness.

3. Applications of Artificial Intelligence

Creation of machine learning models; Image recognition; Defect detection; Generative Design, Pose recognition for human robot collaboration.

4. Introduction to Data Analytics

Concept of Data Analytics; Knowledge mining process; Descriptive analytics; Diagnostic analytics; Predictive analytics; Prescriptive analytics; Data analytics for business performance.

5. Applications of Data Analytics

Statistics and basic analytics; Data analytics for marketing analysis; Computational tools for data analytics.

Teaching/Learning Methodology

The teaching pedagogy of this subject takes a blended learning approach. It consists of the e-leaning module, classroom teaching, tutorials, and experiential learning activities, such as formal lectures, and laboratory sessions. Emphasis is put on the acquisition of required skills and knowledge in AIDA in daily life. The lectures provide the basics and theories while the laboratory activities cover the skills following an interest-based approach. Applying the flipped classroom approach, students are required to prepare for the laboratory exercises in advance.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			
		a	b	c	d
Assignment	10%	✓			✓
Laboratory Exercises	60%		✓	✓	
Quizzes	30%	✓	✓		✓
Total	100%				

Assignment and quizzes are used to assess students' understanding on the concepts, technologies, and applications of AIDA. The laboratories are used to assess their ability on developing AIDA tools.

Student Study Effort Expected

Class contact:		
▪ Lecture	2 hours/week for 4 weeks	8 Hrs.

	▪ Laboratory 2 hours/week for 6 weeks	12 Hrs.
	▪ Tutorial 2 hours/week for 3 weeks	6 Hrs.
	Other student study effort:	
	Self-study	
	▪ E-learning Module and Preparation for Laboratory Exercises	38 Hrs.
	▪ Preparation for Assignments and Quizzes	16 Hrs.
	▪ Total student study effort	80 Hrs.
Reading List and References	1. Wolfgang Ertel. *Introduction to Artificial Intelligence*. Springer International Publishing 2nd edition. 2017. 2. João Moreira, André De Carvalho, Tomáš Horváth. *A General Introduction to Data Analytics*. Hoboken, NJ: John Wiley & Sons. 2019. 3. Ethem Alpaydin. Machine Learning. Cambridge, Massachusetts: The MIT Press. 2021. 4. Gopinath Rebal; Ajay Ravi, Sanjay Churiwala. An Introduction to Machine Learning. Cham: Springer. 2019. 5. Avraham Shtub, Yuval Cohen. *Introduction to Industrial Engineering*. Boca Raton, FL: CRC Press. 2nd edition. c2016. 6. Ramesh Sharda, Dursun Delen, Efraim Turba , Analytics, Data Science, & Artificial Intelligence: Systems for Decision Support, 11th Edition, Pearson, c2020	

Subject Description Form

Subject Code	ISE2001
Subject Title	Introduction to Enterprise Computing
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/Exclusion	Nil
Objectives	This subject enables students to 1. understand the fundamentals and working knowledge in the application of enterprise computing in the running and operation of a company-wide and enterprise-wide business; 2. develop their ability to produce e-solutions.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the basic concept of enterprise computing and how it supports company-wide and enterprise-wide business operation; b. understand basic computing technologies; c. apply computing technologies to implement e-solutions.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Business Enterprise and Enterprise Computing</u> From mainframe to network computing; Client/Server computing; Group-wise electronic messaging, document management systems, and corporate database systems; HTML; XML; VBScript; ASP; PHP; Application of company-wide and enterprise-wide computing 2. <u>Development of Enterprise Applications</u> Development of e-solutions based on applications software; Static and dynamic Webpage; Electronic publishing; Scripting language; Introduction to multimedia; Use of reporting tools; Web programming tools for e-solutions
Teaching/Learning Methodology	A mixture of lectures, tutorials, in-class exercises, laboratory exercises, and a mini-project are used to deliver the topics. Lectures are conducted to enable students to understand the concepts and techniques of enterprise computing which are reinforced by in-class exercises. Practical problems are raised as a

<table>
<tr><td></td><td>focal point for discussion in tutorial classes. Lab sessions and exercises are conducted to enable students to reflect on and apply the knowledge learned. The mini-project enables students to learn how to apply the knowledge to application-oriented projects through teamwork.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1. In-class Exercises</td><td>25%</td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Laboratory Exercises</td><td>10%</td><td></td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>3. Mini-project</td><td>25%</td><td>✓</td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>4. Quizzes</td><td>40%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>

Continuous assessments consist of in-class exercises, lab exercises, a mini-project, and quizzes, which are designed to facilitate students to achieve intended learning outcomes. All assessment components require students to apply computing technologies delivered in class to real-life cases and to implement e-solutions. The mini-project requires students to identify a real-life case of e-business, analyze the case, and design and implement the e-solution by using computing technologies. Quizzes are designed to facilitate students' review in relation to the breadth and depth of their understanding.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures
3 hours/week for 5 weeks; 2 hours/week for 6 weeks</td><td>27 Hrs.</td></tr>
<tr><td>▪ Tutorials 1 hour/week for 6 weeks</td><td>6 Hrs.</td></tr>
<tr><td>▪ Laboratories 3 hours/week for 2 weeks</td><td>6 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Preparation for the mini-project, project presentation, project report, and quizzes</td><td>77 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>116 Hrs.</td></tr>
</table>
</td></tr>
</table>

Reading List and References	1. Kroenke, D and Auer, D 2013, *Database Concepts,* 6th edn, Prentice Hall 2. Harvey & Paul Deitel & AssociatesHarvey DeitelAbbey Deitel 2012, *Internet and World Wide Web How To Program*, 5/E, Pearson 3. Comer, D 2006, *Internet Book, The Everything You Need to Know About Computer Networking and How the Internet Works,* 4th edn, Prentice Hall

Subject Description Form

Subject Code	ISE2002
Subject Title	Instrumentation and Automation Systems
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	HKDSE Physics, Physics I (AP10005), or relevant background
Objectives	This subject will enable students to 1. understand the basics of instrumentation, control, and automation; and 2. apply the basic techniques in measurement and automatic control.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the fundamentals and applications of instrumentation and automation systems; b. understand the static and dynamic characteristics of a system and the concepts on system design and integration; and c. design automation systems for simple engineering tasks.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Roles of instrumentation, control, and automation in engineering. Low cost automation. Physical quantities, their units and standards, calibration, and traceability. General factors affecting measurement and control accuracy. Planning for measurement and automation. 2. <u>Fundamentals of Instrumentation and Automation Systems</u> Basic elements of instrumentation and automation systems. Open-loop and Closed-loop controls. Schematic representation of instrumentation and control systems. 3. <u>System Characteristics</u> Static and dynamic characteristics. Block Diagrams. Calculations of errors and accuracy improvement. Analogue-to-digital and digital-to-analogue conversions.

<table>
<tr><td></td><td>4. <u>Sensing, Control, and Actuation</u>
Sensors and machine vision. Human-machine interface. Programmable controllers. Actuators and feedback. Stepper motor operation. Rotational and Linear motions in an operational system under restricted control.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, laboratory exercises, and tutorials will be used to deliver the various topics in this subject. Some parts of the syllabus will be covered in a problem-based format where this enhances the learning objectives. Others will be covered through directed study in order to enhance the students' self and life-long learning ability.

In particular, some laboratory exercises are application-oriented and thus help students to understand how various testing techniques are inter-related and how they can be integrated in real life situations.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Quizzes</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Laboratory exercises</td><td>30%</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>Competency tests</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Mini-project</td><td>20%</td><td></td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="3"></td></tr>
</table>

Quizzes are used for assessing students' performance as well as monitoring their progress in attaining the intended learning outcomes. Additional tutorial classes will be given to those who need assistance. Students' experimental skills are assessed by the laboratory exercises. The mini-project is used to assess a student's performance in developing simple automation systems. The competency tests are used to assess an individual's ability to apply his/her knowledge and skills learnt from this subject.</td></tr>
<tr><td>Student Study Effort Required</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>21 Hrs.</td></tr>
<tr><td>▪ Laboratory</td><td>9 Hrs.</td></tr>
</table>
</td></tr>
</table>

	▪ Tutorial	6 Hrs.
	▪ Mini-project	3 Hrs.
	Other student study effort:	
	▪ Revision for assessment	46 Hrs.
	▪ Preparation for Laboratory Exercises, Assignments, and Mini-project	30 Hrs.
	Total student study effort	115 Hrs.
Reading List and References	1. B. C. Nakra, K. K. Chaudhry 2004, *Instrumentation, Measurement and Analysis*, Third edition, Tata McGraw-Hill Publishing Co. Ltd. 2. B. R. Mehta, Y. J. Reddy 2015, *Industrial Process Automation Systems, Design and Implementation,* Elsevier Inc 3. Javier Fernandez de Canete 2011, *System Engineering and Automation*, Springer-Verlag Berlin Heidelberg 4. Richard A. Schmitt 2019, *Motor Control and Learning,* Sixth Edition, Human Kinetics	

Subject Description Form

Subject Code	ISE306
Subject Title	Tool Design
Credit Value	3
Level	3
Pre-requisite	Nil
Objectives	This subject enables the student to learn and apply the design of different tools, both technical and economical aspects, with reference to various production equipment and components, such as jigs and fixtures, press tools for sheet metal working, molds for plastic injection molding, and die casting.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply the basic principles in designing general jigs and fixtures, as well as molds and dies; b. assess the performance of a given tool design for meeting the specific design criteria; c. evaluate the effects of a given tool design on work quality.
Subject Synopsis/ Indicative Syllabus	1. <u>Fundamental Principles of Tool Design</u> Design criteria consideration; Application and justification of tool-type selection; Selection of tooling materials 2. <u>Design of Jigs and Fixtures</u> Principles of location and clamping; Design consideration of different types of jigs and fixtures; Applications and case studies 3. <u>Design of Presswork Tools</u> Blanking, piercing, bending, forming, and drawing tools; Compound, combination, and progressive tools; Justification of die selection 4. <u>Design of Plastic Molds</u> Basic construction of plastic injection molds; Functions and requirements of individual components; Decision for the number of cavities

<table>
<tr><td></td><td>5. <u>Design of Die Casting Molds</u>

Design criteria and basic construction of different die casting molds, including the gating and runner systems; Applications and case studies</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, laboratory work, and case studies are used to deliver various topics on this subject matter. Students are divided into small groups and instructed to tackle several major tasks in real life via different CAD software packages. The tasks are covered in a problem-based format, as this can enhance the attainment of the learning objectives. Others are covered through guided studies in order to develop students' ability of "learning to learn."</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1. Assignments</td><td>20%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Test</td><td>40%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3. Mini-group Project</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>

The assessments are designed to help students reflect on and apply periodically the knowledge throughout the class period.

Student performance is continuously assessed by lab work, tutorials, assignments, progress tests, and mini-group projects, as well as presentations and written reports. Students are required to demonstrate their understanding and abilities in these assessment components, which are aligned with the intended learning outcomes.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>30 Hrs.</td></tr>
<tr><td>▪ Tutorial, Tests, Laboratory, and Mini-project</td><td>9 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Assignments</td><td>20 Hrs.</td></tr>
</table>
</td></tr>
</table>

	▪ Preparation for Test, Presentation, and Report Writing	58 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	1. Spitler, D, Lantrip, J, Nee, J, and Smith DA, *Fundamentals of Tool Design*, latest edition, Society of Manufacturing Engineers, Dearborn. 2. Boyes, WE (Ed.), *Handbook of Jig and Fixture Design*, latest edition, Society of Manufacturing Engineers, Dearborn. 3. Menning, G and Stoeckhert, K, *Mold-making Handbook: For the Plastics Engineer*, latest edition, Hanser Gardner Publications, Cincinnati. 4. *Injection Moulds*, latest edition, MS Welling (trans.), *VDI-Verlag*, Dusseldorf. 5. Menqes, G, Michaeli, W, and Mohren, P, *How to Make Injection Moulds*, latest edition, Hanser Gardner Publications, Cincinnati. 6. Street, A (Ed.), *The Diecasting Book*, latest edition, Portcullis Press, Redhill, Surrey.	

Subject Description Form

Subject Code	ISE318
Subject Title	Industrial Engineering Techniques and Methods
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil (but some basics of mathematics such as matrix and probability are preferable)
Objectives	This subject provides students with 1. basic skills for analyzing and improving working methods, procedures and systems in the context of the workstations and a department, taking into account ergonomic considerations in order for them to carry out a project on work improvement in a company for the purpose of productivity improvement; 2. skills in the use of learning curve, as well as a basic understanding of the techniques and concepts of Just-In-Time, Toyota Production System, and Lean Production, thereby allowing them to draft measures for efficiency improvement and waste reduction in industrial engineering; 3. ability to use multi-criterion decision making method (Analytic Hierarchy Process) in order for them to draft industrial decision planning and evaluation (i.e. layout plan selection, human resource strategy, best available technology, sustainable manufacturing); 4. working knowledge on the techniques for facilities layout and their interaction with materials handling system (if relevant), thereby enabling them to evaluate an existing layout and recommend improvements and/or to plan a new layout; 5. basic skills of calculating cycle time, line efficiency, understanding the basic rules for work improvement, mastering the common recording techniques, systems flowchart, quality management tools, and basics for product development (design of goods and service, product life cycle and decision tree to product design).
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. determine productivity and examine an existing work situation and conduct a work improvement program in order to identify low productivity in a

	manufacturing or service company; b. apply appropriate recording techniques, or to design new work methods and procedures, for a manufacturing or service company, and apply lean production methods; c. employ the multi-criterion decision making method (AHP) for industrial decision planning and evaluation; d. master the total quality management tools, the basics of product development, analyze the results, and use line balancing theory for applications, and propose suggestions for improvement for industrial engineering; e. identify the objectives of layout planning in both manufacturing and service companies, evaluate its effectiveness, and apply layout planning techniques, recognizing their limitations when considering relevant constraints.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Productivity; Causes of low productivity in organizations; Resources and outputs, their importance, brief history of industrial engineering techniques and methods, and how they are measured. 2. <u>Work Improvement</u> Leaning Curves. Just in Time (JIT), Toyota Production System/Lean Production. Human resources strategy and job design. Industrial Decision planning and evaluation: Analytical Hierarchy Process (AHP) and multi-criterion decision-making. Layout Planning. Inter relationships among entities. Types of layout manufacturing and offices. Layout planning techniques. Line balancing. Procedure diagrams. Line balancing applications. Flow time, cycle time, line efficiency; Systems flowchart; Recording techniques. Work improvement, benefits, the logical approach, the Pareto Principles, identifying improvement areas in enterprise. Interview Personnel. Recording Techniques. 3. <u>Quality Management and Product development</u> Quality management. Dimensions of quality. **"**Costs**"** of Quality. Total quality management tools. Seven Quality Control tools. ISO 9000 Series of Quality Standards. Design of goods and service. Product Life Cycle. Product Development (Quality Function Deployment). Decision tree to product design. Project management. 4. <u>Layout Planning</u>

<table>
<tr><td></td><td>Objectives, types of layout found in the manufacturing industry and the clerical sector; Systematic layout planning, as applied to manufacturing and clerical work; Introduction to the design of flowlines in manufacturing; Line balancing; Techniques; Efficiency of assembly lines; Balance loss.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, and case studies are used to deliver the various topics in this subject, some of which are covered in a problem-based format, as these can enhance the learning objectives. Others are covered through directed study in order to enhance the students' ability of "learning to learn." Some case studies, largely based on consultancy experience, are used to integrate the topics, thus demonstrating to students how the various techniques are interrelated and how they can be applied in real work situations.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific Assessment Methods/Tasks</td><td rowspan="2">% Weighting</td><td colspan="5">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td></tr>
<tr><td>1. Continuous Assessment (Four Case Studies, each account to 10%)</td><td>40%</td><td></td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination (Open Book)</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="5"></td></tr>
</table>
Continuous assessment comprises case studies with individual and group components. Note: Questions for the assessment of Intended Learning Outcomes (ILOs) may vary from year to year in terms of whether they are by Continuous Assessment or by Examination. However, all ILOs are covered each year. Moreover, all assessment components require students to apply what they learned to realistic work applications.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td><td></td></tr>
<tr><td>▪ Lecture/Tutorial</td><td>3 hours/week for 11 weeks</td><td>33 Hrs.</td></tr>
<tr><td>▪ Laboratory/Case Study</td><td>3 hours/week for 2 weeks</td><td>6 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td><td></td></tr>
<tr><td>▪ Studying and Self-learning</td><td></td><td>38 Hrs.</td></tr>
<tr><td>▪ Case Study and Report Writing</td><td></td><td>28 Hrs.</td></tr>
</table>
</td></tr>
</table>

	Total student study effort	105 Hrs.
Reading List and References	1. Heizer, Jay and Render, Barry, 2014, *Principle of Operations management*, 9th edition, Pearson 2. Mundel ME and Danner DL 1994, *Motion and Time Study: Improving Productivity,* 7th edn, Prentice Hall 3. Tompkins, JA, White, JA, Bozer, YA, Tanchoco, JMA, and Trevino J 1996, *Facilities Planning*, 2nd edn. 4. Gavriel Salvendy (Ed.) 2007, *Industrial Engineering Handbook*, John Wiley & Sons Ltd. Note: Other books with the same or similar titles as above can also be used.	

Subject Description Form

Subject Code	ISE330
Subject Title	Product Safety and Reliability
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Knowledge of calculus & statistics
Objectives	This subject is designed to provide students with an overview of the legal, regulatory, and contractual obligations related to product safety and reliability, as well as the approaches to managing compliance to these obligations.
Intended Learning Outcomes	Upon completion of this subject, students will be able to a. be aware of the safety and reliability requirements in product development; b. evaluate compliance for product safety marks; c. apply relevant methodologies and tools to identify, assess, and mitigate product risks; d. quantify product risks and perform simple failure data analysis.
Subject Synopsis/ Indicative Syllabus	1. <u>Product Liabilities</u> Evolution of product liability concepts: strict liability, tort, warranty; Approaches to mitigating liability; and Product recalls 2. <u>Product Safety Standards</u> Consumer product safety acts, Consumer Product Safety Commission (CPSC), national and international safety standards, and compliance for product safety marks 3. <u>Product Risk Management</u> Availability, reliability, safety and security; Product risk management program 4. <u>Product Safety and Reliability Practices</u> Establishing product safety and reliability policy, FMECA, FTA,

<table>
<tr><td></td><td>HAZOP, HACCP, safety and reliability testing, root cause analysis; Case studies

5. <u>Analytical Methods for Product Risk Assessment</u>

Quantification of risk and failure data analysis</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A combination of lectures, tutorial exercises, and case studies is used to deliver the various topics in this subject. Some of the topics are delivered in a problem-based format to enhance the effectiveness of achieving the learning outcomes. Other topics are covered through directed study or mini-projects designed to enhance students' self-learning skills. Some of the coursework is designed to develop students' ability to apply knowledge in managing product risks.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Examination</td><td>60%</td><td>✓</td><td></td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Continuous Assessment</td><td>40%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>▪ Quizzes/Reflective Journals/Assignments (20%)</td><td></td><td>✓</td><td></td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>▪ Case study (20%)</td><td></td><td></td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
Examination and continuous assessments that take the forms of quizzes and in-class or take-home assignments are designed to assess students' ability to apply the knowledge introduced in the subject in analyzing and solving product safety and reliability problems. Students' performance in these tasks is evaluated individually. The case study is group based and is designed to test students' ability to identify, assess, and mitigate risks in the design of a selected product and to determine the process for obtaining the applicable safety marks. It is assessed based on performance in an oral presentation and the merit of a written report. Students' reflective journals on the case study presentations made by their peer groups are also assessed.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact</td><td></td><td></td></tr>
<tr><td>▪ Lecture</td><td>2 hours/week for 13 weeks</td><td>26 Hrs.</td></tr>
</table>
</td></tr>
</table>

	▪ Tutorial/Case Study/Assessments 1 hour/week for 13 weeks	13 Hrs.
	Other student study efforts	
	▪ Self study: review lecture materials, compile reflective journal, and prepare for examination	32 Hrs.
	▪ Case study: information gathering, group discussion, preparation of oral presentation, and written report	39 Hrs.
	Total student study effort	110 Hrs.
Reading List and References	1. Abbot, H & Tyler, M 1997, *Safer by Design: A Guide to the Management and Law of Designing for Product Safety*, 2/e Gower 2. Geistfeld, M A 2011, *Principles of Products Liability,* 2/e*,* Foundation Press 3. Owen, D G & Davis, M J 2015, *Products Liability & Safety: Cases and Materials*, 7/e, Foundation Press 4. Owen, D G & Davis, M J 2015, *Products Liability & Safety: Cases and Materials 2015-2016 Statutory Supplement*, 7/e, Foundation Press 5. *IEC 60300-1 Dependability Management – Part 1: Guidance for management and application*, 2014 3/e 6. *IEC 60300-3-1 Dependability Management – Part 3-1: Application Guide – Analysis Techniques for Dependability – Guide on Methodology*, 2003 2/e	

Subject Description Form

Subject Code	ISE369
Subject Title	Quality Engineering
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	AMA1110 Basic Mathematics I – Calculus and Probability & Statistics or AMA1103 Introductory Linear Algebra or AMA1104 Introductory Probability
Objectives	The subject will provide students with 1. knowledge of the modern concept of quality; 2. appreciation of the functions served by a quality management system; 3. ability to design quality products to satisfy both internal and external customers; 4. ability to control process performance using appropriate statistical tools; 5. ability to diagnose quality problems and develop sustainable improvement.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply the modern concepts of quality and quality management system to solve the existing quality problems of a company; b. obtain design quality from internal and external customers and formulate plans thereof; c. use appropriate statistical tools for better process control; d. diagnose quality problems and develop substainable improvement.

<table>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>
1. <u>Quality Management Processes</u>

Modern quality concepts; Quality planning, quality control, and quality improvement; New and old 7-QC tools

2. <u>Design for Quality</u>

Reliability fundamental, life distribution, failure rate prediction, and estimation; Failure mode, effects, and criticality analysis (FMECA); Fault tree analysis (FTA);Taguchi approach to achieving quality; Design reviews

3. <u>Statistical Quality Control</u>

Process variation; Process capability study; Control charts; Statistical tolerancing; Acceptance sampling plans

4. <u>Partnership with Suppliers</u>

Vendor evaluation; Joint planning with suppliers; Best practices of partnership with suppliers

5. <u>Quality Management Systems</u>

ISO 9000 series of standards; Quality audits; Product and system certification programs

6. <u>Quality Improvement</u>

Project approach to quality improvement; Diagnostic techniques for identifying root causes; Implementing change and substaining gains
</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The major teaching activities contain a combination of lectures, tutorials, and practical exercises to achieve the objectives of this subject. Some of the topics are not taught in the classroom environment; students are directed to learn these topics by themselves during the process of writing problem-based assignments.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Assignment & tests</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">
<table>
<tr><td>3. Case Studies</td><td>10%</td><td>✓</td><td>✓</td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="6"></td></tr>
</table>
The continuous assessment involves three components: two tests (10%), two case studies (10%), and four take-home assignments (20%). The tests aim to assess the interim knowledge gained by the students. The assignments are designed to assess students' ability to apply the equations in assessing the performance of the processes. The case study requires students to complete two team projects involving quality improvement and quality management. The results of the case study are presented both orally and in written form. The final examination is also used to assess the abilities of students in achieving the learning outcomes of the subject.
</td></tr>
<tr><td rowspan="7">Student Study Effort Expected</td><td>Class contact</td><td></td></tr>
<tr><td>▪ Lecture 2 hours/week for 13 weeks</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorial/Case Study 1 hour/week x 13 weeks</td><td>13 Hrs.</td></tr>
<tr><td>Other student study efforts</td><td></td></tr>
<tr><td>▪ Self Study/Assignment</td><td>58 Hrs.</td></tr>
<tr><td>▪ Case Study</td><td>13 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>110 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">
1. Montgomery, D C 2009, Introduction to Statistical Quality Control, 6th edition, John Wiley

2. Gryna, F M 2000, Quality Planning & Analysis, 4th edition, McGraw Hill

3. ISO 9001: 2008, Quality Management Systems – Requirements
</td></tr>
</table>

Subject Description Form

Subject Code	ISE386
Subject Title	Integrated Design for Manufacture
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Exclusion : ISE3003 Design for Manufacture and Sustainability
Objectives	This subject provides students with 1. knowledge on how product life cycle issues affect the design of a product; 2. fundamental knowledge on approaches and methods of value engineering, design for manufacture, design for quality, design for manufacturability, design for additive manufacturing, and design for environment.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the concept of value engineering; b. analyze a part design for manufacturability; c. apply appropriate methods to consider quality issue in product design stage; d. analyze product design for additive manufacturing and environment.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Product Development and Design for Product Life Cycle</u> Product development process, Product development methods, Design for manufacture and product lifecycle 2. <u>Value Engineering</u> Concept of value, Value analysis, Product improvement 3. <u>Quality in Design</u> Quality function deployment, Robust design 4. <u>Design for Additive Manufacturing (DfAM)</u>

<table>
<tr><td></td><td>Introduction to AM, Design guidelines, DfAM methodology

5. <u>Design for Manufacturability</u>

Part design for injection molding and sheet metal operations

6. <u>Design for Environment</u>

Design for disassembly, Design for recycling</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, case studies, a group project, and laboratory exercises are used to deliver various topics on the subject. Some topics are covered in a problem-based format wherein learning objectives are enhanced, others are covered by directed studies to enhance students' "learning to learn" ability.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Assignments</td><td>55%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Tests</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Group project</td><td>15%</td><td></td><td></td><td></td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
The tests and the assignments are all aimed at assessing students with respect to all the intended learning outcomes. The group project is aimed at assessing students with respect to the intended learning outcomes a and e.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>22 Hrs.</td></tr>
<tr><td>▪ Tutorials and case studies</td><td>9 Hrs.</td></tr>
<tr><td>▪ Laboratory exercises</td><td>8 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Take-home assignments</td><td>58 Hrs.</td></tr>
</table>
</td></tr>
</table>

	▪ Preparation for tests	25 Hrs.
	Total student study effort	122 Hrs.
Reading List and References	1. Boothroyd, G., Dewhurst, P. and Knight, W.A. 2002, *Product Design for Manufacture and Assembly*, Marcel Dekker, N.Y. 2. Ficalora, J.P. and Cohen, L. 2010, *Quality Function Deployment and Six Sigma*, Prentice Hall 3. Wu, Y. and Wu, A. 2000, *Taguchi Methods for Robust Design*, ASME Press 4. Otto, K. and Wood, K. 2001, *Product Design:* techniques in reverse engineering and new product development, Prentice Hall 5. Lewis, H & Gertsakis, J 2001, *Design + Environment: A Global Guide to Design Greener Goods*, Greenleaf Publishing Ltd. 6. Gibson, I., Rosen, D., Stucker, B., 2015, Additive Manufacturing Technologies: 3D Printing, Rapid prototyping and Direct Digital Manufacturing, Second Edition, Springer New York.	

Subject Description Form

Subject Code	ISE3001
Subject Title	Operations Research I
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject will provide students with 1. ability to understand the concepts and importance of Operations Research; 2. knowledge of formulating mathematical models in day to day business operations; 3. skills in improving management by applying Operations Research theories in real life; 4. Operations Research models in decision makings.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. recognize the importance of Operations Research; b. build an Operations Research model from real-life problems; c. understand Operations Research theories and models and their applications to a variety of scenarios; d. apply computer tools to obtain optimal solutions from a mathematical model.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Basic concepts in Operations Research and Mathematical Modeling. 2. <u>Linear Programming</u> Concept in Linear Programming, Graphics method, the Simplex method, Duality Theory.

<table>
<tr><td></td><td>
3. <u>The Assignment and the Transportation Problem</u>

The model of the assignment problem, and the transportation problem. The transshipment problem.

4. <u>Decision Analysis</u>

Decision Tree, Bayesian Analysis, Utility Theory

5. <u>Integer Linear Programming</u>

Concepts in Integer Programming, the Branch-and-Bound Algorithm. The cutting plane method.

6. <u>Network and Dynamic Programming</u>

Network and methods. Dynamic Programming and its applications.
</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, and case studies will be used to deliver the various topics in this subject. Some of them will be covered in a problem-based format which enhances the learning objectives. Others will be covered through directed study in order to enhance the students' ability of "learning to learn". Some case studies will be used to integrate these topics and thus demonstrate to students how the various techniques are interrelated and how they can be applied to real problems in industry.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Assignment exercise</td><td>15%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. laboratory/case study</td><td>15%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>4.Test</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
The assignment exercises, case studies and laboratory assess students' capability to synthesize and apply the concepts and skills learnt in analyzing and solving Operations Research problems.
</td></tr>
</table>

	The examination assesses students' understanding on the concepts and capability in the application of the skills for analyzing and solving problems related to the subject.	
Student Study Effort Expected	Class contact:	
	▪ Lectures 3 hours/week for 10 weeks	30 Hrs.
	▪ Lab., Presentation, Test 3 hours/week for 3 weeks	9 Hrs.
	Other student study effort:	
	▪ Preparation and Review, Self-study	60 Hrs.
	▪ Report Writing	21 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	1. Rader, D. J. 2010, *Deterministic Operations Research: Models and Methods in Linear Optimization*, J. Wiley & Sons 2. Taha, H. A. 2007, *Operations Research*, 8th edn, Pearson 3. Taylor, B. W. III 2013, *Introduction to Management Science*, 11th edn, Prentice Hall 4. Schrage, L. 1997, *Optimization Modeling with LINDO*, 5th edn, Thomson 5. Winston, W. L. 2004, *Operations Research: Applications and Algorithms,* 4th edn, Thomson 6. Williams, H. P. 2013, *Model Building in Mathematical Programming*, 5th edn, Wiley 7. Hillier, F. S. and Lieberman, G. J. 2010, *Introduction to Operations Research*, 9th edn, McGraw-Hill 8. Ravindran, R. 2009, *Operations Research*, CRC Press	

Subject Description Form

Subject Code	ISE3002
Subject Title	Planning of Production and Service Systems
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. an understanding of the concepts of production and service systems; 2. the ability to apply principles and techniques in the design, planning and control of these systems to optimize/make best use of resources in achieving their objectives.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply the systems concept for the design of production and service systems; b. make forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques; c. apply the principles and techniques for planning and control of the production and service systems to optimize/make best use of resources; d. understand the importance and function of inventory and to be able to apply selected techniques for its control and management under dependent and independent demand circumstances.
Subject Synopsis / Indicative Syllabus	*1.* *The Systems Concept* The transformation model of production systems. The boundary and attributes of a socio-technical production system. Effects of the environmental factors. Systems balance and sub-optimization. The need for systems integration and adaptation to environment. *2.* *Forecasting* Production demand management. Qualitative and quantitative methods in

forecasting. Forecasting errors and control. Forecasting and its relationship to capacity planning.

3. *Capacity Planning*

Capacity measurement. Aggregate units. Manual and mathematical methods for aggregate planning. Master production scheduling.

4. Inventory Control and Material Requirement Planning (MRP)

Independent inventory control and management; Types of inventory; Continuous review and periodic review systems; Reorder level and order quantities, including quantity discounts; ABC analysis. Planning of dependent inventory; MRP concepts and principles; Lot sizing

5. Operations Loading and Scheduling

Gantt charts for loading and scheduling. Techniques and algorithms for operations scheduling and Personnel Scheduling

6. Just-in-time and Lean Manufacture

Push and pull systems of production control; Advantages and limitations; Set-up and changeover times and their reduction; Use of Kanban; Effect on inventory; Issues of implementation

Teaching/Learning Methodology

A mixture of lectures and workshops will be used to deliver the various topics in this subject to attain the intended learning outcomes. Some of which will be covered in a problem-based format where this enhances the learning outcomes. Others will be covered through directed study in order to enhance the students' ability of "learning to learn". Workshops are conducted as group activities so that students can discuss, practice and understand materials in the class. Case studies and simulation exercises will be provided to provoke students' further thinking about and integration of the factors related to real life problem solving in the discipline of studies.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% Weighting	Intended subject learning outcomes to be assessed			
		a	b	c	d
1. Assignments/Case Studies	20%	✓	✓	✓	✓
2. Workshop Exercises	20%		✓	✓	

	3. Examination	60%	✓	✓	✓	✓
	Total	100%				

The assignments/case studies assess students' ability to synthesize and apply the concepts and skills learnt in solving problems related to the subject.

The workshop exercises assess students' capability in the planning and control of activities in production and service systems to optimize/make the best use of resources to attain system's objectives.

The examination assesses students' understanding on the concepts and in the use of the skills in solving problems related to the subject.

Student Study Effort Expected		
	Class Contact:	
	▪ Lecture 2.0 hours/week for 12 weeks	24 Hrs.
	▪ Workshop 3.0 hours/week for 5 weeks	15 Hrs.
	Other student study effort:	
	▪ Studying and self learning	59 Hrs.
	▪ Assignment and report writing	25 Hrs.
	Total student study effort	123 Hrs.

Reading List and References

1. Krajewski, L J, Ritzman, L P and Malhotra, M K 2013, *Operations Management: Processes and Supply Chains*, Upper Saddle River, N.J.: Pearson/Prentice Hall
2. Nahmias, S 2009, *Production and Operations Analysis,* 5th edn, McGraw-Hill
3. Schroeder, R G, Goldstein, S M and Rungtusanatham, M J 2013, *Operations Management : Contemporary Concepts and Cases,* New York, NY : McGraw-Hill/Irwin
4. Chase, R B., Aquilano, N J, and Robert, J F 2006, *Operations Management for Competitive Advantage*, Boston: McGraw-Hill Irwin
5. Shafer, S M and Meredith, J R 2003, *Operations Management*, New York: John Wiley & Sons
6. Vollmann, T E et al. 2005, *Manufacturing Planning and Control Systems for Supply Chain Management*, New York: McGraw-Hill

	7. Turner, W C et al. 2001, *Introduction to Industrial and Systems Engineering*, Beijing : Tsing Hua University: Prentice Hall 8. Schroeder, R G and Flynn, B 2001, *High Performance Manufacturing: Global Perspectives,* New York: John Wiley 9. Sipper, D and Bulfin, R L Jr 1997, *Production: Planning, Control, and Integration,* McGraw-Hill 10. Markland, R E, Vickery, S K, and Davis, R A 1998, *Operations Management: Concepts in Manufacturing and Services*, Cincinnati, Ohio : South-Western College Pub

Subject Description Form

Subject Code	ISE3004
Subject Title	Systems Modeling and Simulation
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with 1. the basic system concept and definitions of system; 2. techniques to model and to simulate various systems; 3. the ability to analyze a system and to make use of the information to improve the performance.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the system concept and apply functional modeling method to model the activities of a static system; b. understand the behavior of a dynamic system and create an analogous model for a dynamic system; c. simulate the operation of a dynamic system and make improvement according to the simulation results.
Subject Synopsis/ Indicative Syllabus	1. <u>System definitions and classification</u> Introduction to system definitions. System Classification. Components in a System. 2. <u>Basic Static and Dynamic System Modeling Techniques</u> Static System Modeling: IDEF0 (Input, Control, Output, Mechanism). Dynamic System Modeling: Stella (Stock, Flow, Converter). 3. <u>Introduction to Discrete Event Simulation</u> Analytical and Simulation Modeling, Simulation Worldviews, Preparation for Model Building. Generation of Random Number and

<table>
<tr><td></td><td>Vitiate. Introduction to Distribution Functions, Fitting of Probability Distribution Function to Data.

4. <u>Applications of Discrete Event Simulation</u>

Simulation Modeling with Probabilistic Functions. Applications of Simulation in Business, Medical, Manufacturing and Transportation systems.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The emphasis of this subject is on application aspects and considerable efforts are needed on hand-on activities. Teaching is conducted through class lectures, tutorials, laboratory exercises and a mini-project in related to the application of simulation. The lectures are targeted at the understanding system concept, modeling methods, and different simulation techniques. Substantial works on laboratory exercises and tutorials are employed to enforce students' capabilities in building system models and application of simulation software. The mini-project is to give students a chance of conducting a simulation related project in a more comprehensive manner, and test/quiz is used to classify students' achievement in this subject.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>Laboratory/Exercise</td><td>40%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Mini-project/Case Study</td><td>30%</td><td></td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Test/Quiz</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100 %</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Each laboratory exercise would be divided into two parts such that the group work would have to be submitted by the end of the laboratory class while the individual component can be hand-in afterward. Test/quiz will be given to access students' learning outcomes, and, a mini-project in related to application of simulation in practical situation.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td></td><td>▪ Lecture/Seminar

2 hours/week for 6 weeks</td><td>12 Hrs.</td></tr>
</table>

	▪ Tutorial/Hand-on Exercise 2 hours/week for 3 weeks	6 Hrs.
	▪ Laboratory/Case Study/Test 3 hours/week for 5 weeks + 6 hours/week for 1 week	21 Hrs.
	Other student study effort:	
	▪ Project report	31 Hrs.
	▪ Self Study/Laboratory Report	52 Hrs.
	Total student study effort	122 Hrs.
Reading List and References	1. Zeigler, BP, Praehofer, H, Kim, TG 2000, *Theory of Modeling and Simulation: Integrating Discrete Event and Continuous Complex Dynamic Systems*, Academic Press 2. Altiok, T, Melamed, B 2007, *Simulation Modeling and Analysis with Arena*, Academic Press 3. Evans, JR, Olson, DL 2001, *Introduction to Simulation and Risk Analysis*, Prentice Hall, New Jersey 4. Banks J. et al., 2010, *Discrete-Event System Simulation*, Pearson Education 5. Kelton, WD, Sadowski, R, Zupick, 2014, *Simulation with Arena*, McGraw-Hill	

Subject Description Form

Subject Code	ISE3006
Subject Title	Materials and Processes Selection
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject will provide the students with 1. an understanding of properties and applications of engineering materials; 2. an understanding of working principles of basic manufacturing processes for common materials; 3. an understanding of the interaction between material, shape, process and functional requirements of products in the materials and processes selection; 4. the knowledge of a systematic approach to the choice of materials and processes for a range of products, with consideration of economical, technological and environmental factors.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. exemplify the importance of engineering materials in product design; b. recognize the availability of different processing routes for the manufacture of a product; c. establish a link between material, shape, process and functional requirements of a product in materials and process selection; d. apply suitable methodologies to perform materials selection and determine appropriate manufacturing processes to achieve desired shapes and functional requirements for a range of products with respect to economical, technological and environmental factors.
Subject Synopsis/ Indicative Syllabus	***1. Properties, Applications and Selection of Engineering Materials*** Ferrous and non-ferrous alloys, engineering plastics, ceramics and

<table>
<tr><td></td><td>composites; Properties of engineering materials and their applications. Materials selection charts, performance maximizing criteria, material indices based on Ashby's analysis.

2. Fundamentals of Manufacturing Processes

Classification of manufacturing processes; metal processing technologies: casting, powder metallurgy, bulk formation, sheet metal forming, conventional and non-conventional material removal; polymer processing technologies: injection molding, compression and transfer molding, extrusion, thermoforming, rotational molding, advanced molding technologies; joining and surface finishing processes.

3. Process Selection and Economic Consideration

Process screening by attributes: material, size, shape, accuracy, surface finish, bulk and surface properties; economic production capabilities of typical processes: equipment and tooling cost, production rate, and economic production quantity.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Theories of the technologies involved are introduced in the lectures via a case study approach. The materials and processes selection are supported by using a software package "CES" in the Digital Factory of the Department. Tutorials are used to facilitate the understanding of such theories as well as the interaction between material, process, shape and function through group discussions and case studies, whereas a mini-project is used to review students' understanding of process selection.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Assignments</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Mini-project</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Test</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>4. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
The assignments are designed to reflect students' understanding of the subject</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">and to assist them in monitoring their progress.

The mini-project is designed to assess the student's ability in selecting appropriate materials and manufacturing processes for particular components or products with consideration to technical, economical and environmental aspects of the available processes.

The test and examination are used to assess the students' understanding of the subject content and to determine their ability in achieving the subject learning outcomes after the subject has been completed.</td></tr>
<tr><td rowspan="8">Student Study Effort Required</td><td>Class contact</td><td></td></tr>
<tr><td>▪ Lectures</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorials and laboratory work</td><td>13 Hrs.</td></tr>
<tr><td>Other student study efforts</td><td></td></tr>
<tr><td>▪ Preparation for assignments, mini-project and laboratory report</td><td>27 Hrs.</td></tr>
<tr><td>▪ Self-study and preparation for test and examination</td><td>57 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>123 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">1. Kalpakjian, S & Schmid, K S 2010, Manufacturing Engineering and Technology, New York: Prentice Hall.

2. Schey, J A 2000, Introduction to Manufacturing Processes, Boston: McGraw Hill.

3. Groover, M P 2010, Fundamentals of Modern Manufacturing: Materials, Processes and Systems, Hoboken, NJ: Wiley.

4. Ashby, MF 2011, Materials Selection in Mechanical Design, Butterworth-Heinenann, Oxford.

5. Callister, WD, Rethwisch, DG 2008, Fundamentals of Materials Science and Engineering: An integrated approach, John Wiley & Sons, Hoboken, NJ.</td></tr>
</table>

Subject Description Form

Subject Code	ISE3007
Subject Title	Integrated Product Engineering Project I
Credit Value	3
Level	3
Pre-requisite/Co-requisite	Nil
Objectives	This subject facilitates students to develop their ability in applying various computer-aided technologies on product development with the aim to: 1. enable them to understand various computer-aided technologies and their application on design, analysis and manufacture of new products; 2. provide them with the platform to apply appropriate methodologies and software tools involved in product design; 3. provide them the opportunity to function effectively in a multidisciplinary team.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. model product geometries; reuse product information in new product development; b. analyse and optimise a product within realistic constraints by applying appropriate methods; c. communicate (oral, written, graphical, and numerate) effectively.

Subject Synopsis/ Indicative Syllabus

Students are required to work through the various stages step-by-step from conceptual design to implementation and evaluation. The subject is expected to cover the following topics:

1. Statistical Analysis for Product Development

Factor analysis, Reliability analysis, One-way and two-way ANOVA

2. Computer-aided Design (CAD)

Geometric modeling, Solid modeling, Assembly modeling

3. Reverse Engineering for Product Design

Three-dimensional (3D) digitalization of real physical object, Processing of acquired 3D digitalized data points, Generation of solid 3D CAD model

4. Rapid Prototyping

Additive manufacturing Technologies, Subtractive manufacturing Technologies

Teaching/Learning Methodology

This is an activity-orientated subject which adopts a problem-based learning approach. Formal lectures, tutorial and laboratory sessions are available to provide students guidelines and assistance in conducting the project. Students will work in a small group for a product-based project. Through the blended learning approach, the teaching and learning activities in each stage of the project are used to facilitate students to achieve the intended learning outcomes. Feedback will be given to students for making improvement.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
		a	b	c
1. Individual Assignments	20%	✓	✓	✓
2. Quiz	20%	✓	✓	
3. Product-based project	60%	✓	✓	✓
Total	100%			

The individual assignments are used to assess students' understanding of concept and theories/principles related to product engineering as well as their

	ability to apply them in solving problems related to the subject. For the product-based project, it consists of both "group work" and "individual work" to assess students' abilities in applying the learnt concepts and skills in solving product engineering problems. A report is used to let students demonstrate their abilities in presenting their projects clearly and logically including the project objectives, their approaches to solve the problem and the deliverable of their projects. The quiz is also used to assess the abilities in achieving the learning outcomes of the subject.	
Student Study Effort Required	Class contact:	
	▪ Tutorial and laboratory sessions	39 Hrs.
	▪ Other student study effort:	
	▪ Preparation of reports and oral presentation	42 Hrs.
	Guided Study/Self-learning	45 Hrs.
	▪ Total student study effort	126 Hrs.
Reading List and References	1. Willard, C.A. 2020, *Statistical Methods: An Introduction to Basic Statistical Concepts and Analysis*, Routledge, 2nd Edition 2. Chang, K.H. 2014, *Product Design Modeling using CAD/CAE: the computer aided engineering design*, Oxford: Academic Press 3. Howard, W.E., Musto, J.C. 2020, *ISE Introduction to Solid Modeling Using Solidworks*, McGraw Hill, 16th Edition 4. Otto, K. 2001, *Product Design: Techniques in Reverse Engineering and New Product Development,* Prentice Hall 5. Davim, J.P., 2019, *Additive and Subtractive Manufacturing: Emergent Technologies*, De Gruyter Oldenbourg 6. Gebhardt, A. 2012, *Understanding Additive Manufacturing: Rapid Prototyping, Rapid tooling, Rapid Manufacturing*, Hanser Publications 7. Training materials published by the Industrial Centre, The Hong Kong Polytechnic University	

Subject Description Form

Subject Code	ISE3019
Subject Title	Industrial Control Systems and Their Applications
Credit Value	3
Level	3
Pre-requisite/~~Co-requisite/Exclusion~~	ISE2002 Instrumentation and Automation Systems
Objectives	This subject provides students with 1. the knowledge of data manipulation for industrial applications; 2. the knowledge and skills to apply the data manipulation technologies for implementing industrial control and automation; and 3. the working principles of closed loop and Internet connected systems.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. define and conduct the functional operations in a target system; b. manipulate and visualize the system transition and looping activities; and c. establish the protocols and structures for system smartness and Internet connectivity including human machine interface (HMI), smart sensing, and distributed control system (DCS).
Subject Synopsis/ Indicative Syllabus	1. <u>Smart Sensing in Industrial Systems and Human Machine Interface (HMI)</u> Introduction to Smart Sensors. Data processing in predefined functions and patterns, association of proper computing capabilities. Definition and Evaluation of HMI in an industrial system. 2. <u>Proportional-Integral-Derivative (PID) Controller</u> Introduction to feedback and PID control. Closed loop control algorithm and regulation of system variables in a control process. Servomechanism and its requirement for robotics.

<table>
<tr><td></td><td>3. <u>Distributed Control System and Internet of Things (IoT)</u>

Effectiveness and efficiency of systems with interconnected and shared devices and information. Machine-to-machine connectivity protocol. Network control for robotics and machineries. Connectivity and functionality of IoT.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The teaching pedagogy of this subject is a combination of classroom teaching and experiential learning. It consists of a series of lectures and well-organized laboratory activities. Emphasizing is put on the acquisition of practical skills and knowledge in multiple data handling for system control. The lectures provide the basics and theories while the laboratory activities cover the skills following an interest-based approach.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Quizzes and Midterm Test</td><td>40%</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Laboratory Exercises</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Final Examination</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td></tr>
</table>
Each laboratory exercise would be divided into two groups; the individual report can be hand-in afterwards. Tutorials would be provided to students to improve their understanding of the subject materials and final examination will be given to assist the assessment of students' learning outcomes.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture 3 hours/week for 7 weeks</td><td>21 Hrs.</td></tr>
<tr><td>▪ Tutorial/Laboratory 3 hours/week for 6 weeks</td><td>18 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>Self-study</td><td></td></tr>
<tr><td>▪ Laboratory Reports</td><td>39 Hrs.</td></tr>
<tr><td>▪ Preparation for Tests and Examination</td><td>39 Hrs.</td></tr>
</table>
</td></tr>
</table>

	▪ Total student study effort	117 Hrs.
Reading List and References	1. Technology, A handbook for Engineers and Researchers, William Andrew Inc, New York 2. John Krumm 2018, *Ubiquitous Computing Fundamental*, CRC Press, Taylor & Francis Group, A Chapman & Hall Book 3. Kilian C T 2004, *Modern Control Technology*, 3rd Edition, Thomson Delmar Learning 4. Hiroto Yasura, C. M. Kyung 2017, *Smart Sensors at the IoT Frontier*, Springer 5. Randy Frank 2013, Understanding *Smart Sensors*, 3rd Edition, Artech House, Boston/London 6. Peng Zheng 2008, *Industrial Control Technology*: a Handbook for Engineers and Researchers	

Subject Description Form

Subject Code	ISE404
Subject Title	Total Quality Management
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Students who do not have background knowledge in quality control and quality engineering should be prepared to do additional reading.
Objectives	This subject provides students with the knowledge to 1. understand the philosophy and core values of Total Quality Management (TQM); 2. determine the voice of the customer and the impact of quality on economic performance and long-term business success of an organization; 3. apply and evaluate best practices for the attainment of total quality.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. select and apply appropriate techniques in identifying customer needs, as well as the quality impact that will be used as inputs in TQM methodologies; b. measure the cost of poor quality and process effectiveness and efficiency to track performance quality and to identify areas for improvement; c. understand proven methodologies to enhance management processes, such as benchmarking and business process reengineering; d. choose a framework to evaluate the performance excellence of an organization, and determine the set of performance indicators that will align people with the objectives of the organization.
Subject Synopsis/ Indicative Syllabus	1. *Principles of Total Quality* Concepts of quality; Core values and paradigms for TQM, including corporate citizenship and protection of the environment; Models for performance excellence: Deming Prize, Baldrige Quality Award, European Quality Award

<table>
<tr><td></td><td>
2. <u>Customer Needs</u>

Internal and external customers; Voice of the customer; Customer satisfaction; Customer loyalty; Service recovery; Crisis management

3. <u>Economics of Quality</u>

Classification and analysis of quality costs; Implementing quality costing systems; Economic value of customer loyalty and employee loyalty

4. <u>TQM Methodologies</u>

Quality Function Deployment (QFD); Benchmarking; Business process reengineering; Process improvement

5. <u>Learning and Growth</u>

Organizational learning; Organizational renewal; Change management; Employee empowerment

6. <u>Strategic Quality Management</u>

Vision, strategy, goals, and action plans; Measurement of organizational performance
</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, group discussions (tutorials), and mini-case studies are used to achieve the objectives of this subject. Some topics are taught in the classroom environment; students have to learn these topics by themselves in the process of writing problem-based assignments. Directed study is also used to develop the self-learning ability of students.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Assignments</td><td>35%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Tests</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3.Examination</td><td>45%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
The assignments, reflective journals, essays, and case studies facilitate the
</td></tr>
</table>

	application of concepts and skills learned in analyzing and attaining total quality while emphasizing factors that may affect decisions. Examination/tests allow students to demonstrate the extent of their understanding of concepts, as well as their abilities to analyze and solve problems related to the subject.	
Student Study Effort Expected	Class contact:	
	▪ Lecture/Tutorial 2 hours/week for 13 weeks	26 Hrs.
	▪ Tutorial/Case Study 1 hour/week for 13 weeks	13 Hrs.
	Other student study effort:	
	▪ Studying and self learning	50 Hrs.
	▪ Assignment and report writing	28 Hrs.
	Total student study effort	117 Hrs.
Reading List and References	1. Besterfield, DH, et.al. 2003, *Total Quality Management*, 3rd edn, Prentice Hall 2. Goetsch, DL & Davis, B 2006, *Quality Management: Introduction to Total Quality Management for Production, Processing and Services*, 5th edn, Pearson 3. Gryna FM 2001, *Quality Planning & Analysis*, 4th edn, Jr., McGraw-Hill 4. Selected articles in Quality Progress and the web site of American Society for Quality	

Subject Description Form

Subject Code	ISE418
Subject Title	Computer-Aided Product Design
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	IC2105 Engineering Communication and Fundamentals or equivalent
Objectives	This subject provides students with 1. knowledge of various computer-aided engineering theories and virtual technologies in product design; 2. skills to develop product design solutions using various computer-aided engineering tools; 3. knowledge of multi-attribute decision making, product design and data management.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply parametric design in computer-aided product design; b. apply product data management and virtual technologies to support in product design and data management; c. understand and apply computer-aided engineering analysis (CAE) in product design.
Subject Synopsis/ Indicative Syllabus	1. Computer-aided Engineering Analysis Essential requirements of a good product design. Computational tools for product design and manufacturing. Finite element analysis and optimization in product design. 2. Parametric Design Basic concept of parametric modeling. Model complex forms and relationships using geometric concepts and parametric tools. 3. Product Data Management (PDM)

<table>
<tr><td></td><td>Bill of Materials (BOM) creation and concepts. PDM system. PDM system in product lifecycle.

4. <u>Virtual Product Design and Evaluation</u>

Application of Virtual Reality (VR) and Augmented Reality (AR) technologies in product design. Computer modeling for VR/ AR. Multi-attribute decision making approach.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorials, and student-centred learning activities is used to achieve the above outcomes. A series of laboratory classes is provided to students to gain hands on experience in computer-aided product design. Case studies and problem-based learning approach are adopted to provide students a practical product design and experience for improving the functional performance of a real product. In the tutorials, exercises are provided to reinforce the theories, methodologies, and tools introduced in the lectures. Other material is covered through directed study to enhance the students' "learning to learn" ability. Some case studies, largely those based on consultancy experience, are used to integrate these topics and demonstrate to students how the various techniques are interrelated and applied in real-life situations.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1.Assignments</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Mini projects</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>3. Test</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Assignments are used to assess students' understanding of three-dimensional operations, modelling methods, and mechanics of materials, and their ability to apply them in computer-aided product design. Moreover, they are designed to develop students' understanding of these topics and their ability to apply them in product design.

Mini projects are used to assess whether students can carry modelling and analysis for product design, and develop their early research skills. Students are required to improve a product functionality or performance. The projects can assess whether they can apply the modelling and PDM techniques, as well as</td></tr>
</table>

	whether students can apply FEA in product design and performance evaluation. A test is given to assess whether students truly understand the subject matters and how to use them in product design.	
Student Study Effort Expected	Class contact:	
	▪ Lectures 3 hours/week for 7 weeks	21 hrs.
	▪ Laboratory work/Case studies/Tutorials 3 hours/week for 6 weeks	18 hrs.
	Other student study effort:	
	▪ Coursework	50 hrs.
	▪ Preparation for tests and projects	30 hrs.
	Total student study effort	119 hrs.
Reading List and References	1. Bungartz, H.J., Griebel, M., & Zenger, C., *Introduction to Computer Graphics*, Charles River Media 2004 2/e 2. Burdea, G., *Virtual Reality Technology*, Wiley-Interscience, 20032/e 3. Moaveni, S., *Finite Element Analysis: Theory and Application with ANSYS,* Pearson Prentice Hall 2014 4/e 4. Zeid, I., *Mastering CAD/CAM*, McGraw-Hill 2005 5. Eger, A., & Ebrary, Inc. (2013). Product design. The Hague: Eleven International Publishing. 6. Y.M. Tang and H.L. Ho (April 6th 2020). 3D Modeling and Computer Graphics in Virtual Reality, Mixed Reality and Three-Dimensional Computer Graphics, Branislav Sobota and Dragan Cvetković, IntechOpen, DOI: 10.5772/intechopen.91443. Available from: https://www.intechopen.com/books/mixed-reality-and-three-dimensional-computer-graphics/3d-modeling-and-computer-graphics-in-virtual-reality	

Subject Description Form

Subject Code	ISE430
Subject Title	New Product Planning and Development
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Exclusion: MM484 Managing New Product Development
Objectives	This subject will enable students to 1. understand the new product development process and strategic features of new product development; 2. develop strategic thinking and planning abilities throughout the early product design stage; 3. understand various techniques for new product planning.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. appreciate the generation of product concepts that satisfy the needs of customers; b. explore and analyze market needs and appreciate their direct relationship with new products; c. identify new product opportunities; d. introduce financial, environmental, social, and cultural considerations with regard to design decisions.

Subject Synopsis/ Indicative Syllabus	1. Introduction to New Product Planning and Development New product planning and development process, Types of new products, Drivers of new product development, Success and failure factors, New product development strategy, Analysis of business and completion environments for new product development 2. Issues of Strategic Planning for New Products Modular product design, Product architecture, Product family design, Product line design, Product Portfolio planning, Customized products versus mass products, Technology roadmapping 3. Customer Needs and Value Acquisition, organization and analysis of customer needs, Customer value and its measurement 4. Segmentation, Targeting, and Positioning Market and benefit segmentation and its techniques, Product positioning, Perceptual mapping, Value mapping 5. Opportunity Specification and Justification Needs analysis, Ethnography, Scenario analysis, Product innovation charter 6. Defining Design Specification Conjoint analysis, QFD-based techniques 7. Concept Test Concept statements, Considerations, Formats 8. Sales Forecasting and Financial Analysis Sales forecasting models, Choice modeling, Pricing techniques for new products, Examples of financial plans
Teaching/Learning Methodology	Teaching and learning activities include lectures, tutorials, case studies, a group project, and a laboratory exercise. The lectures are aimed at providing students with the basic understanding of new product development process, as well as common techniques and methods used in new product planning. In tutorial classes, small group discussions are facilitated for students to enhance their understanding of the subject matter. Through a number of minor exercises in

<table>
<tr><td></td><td>tutorial classes, students not only have better understanding of the subject matter, but teachers are also allowed to monitor their learning progress. All the case studies are related to real-life successful and failed cases of new product development. Through the case studies, students can appreciate various issues and factors leading to the success and failure of new product development. Laboratory exercises provide students with hands-on experience on the segmentation and generation of perceptual maps.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Case studies</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Assignments</td><td>45%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>3. Test</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>

The case studies are aimed at assessing all the ILOs of students. The assignments of this subject contain in-class assignments and take-home assignments which are used to assess the ILOs a, b and c of students. A test is normally conducted by the end of the semester and is aimed at assessing all the ILOs of students.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures</td><td>24 Hrs.</td></tr>
<tr><td>▪ Tutorials</td><td>11 Hrs.</td></tr>
<tr><td>▪ Laboratory exercise</td><td>2 Hrs.</td></tr>
<tr><td>▪ Test</td><td>2 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Case studies</td><td>25 Hrs.</td></tr>
<tr><td>▪ Preparation for test</td><td>28 Hrs.</td></tr>
<tr><td>▪ Take-home assignments</td><td>30 Hrs.</td></tr>
</table>
</td></tr>
</table>

	Total student study effort	122 Hrs.
Reading List and References	1. Crawford, C.M., and Di Benedetto, C.A., 2020, *New Products Management*, 12th Edition, McGraw Hill 2. Lilien, G.L. and Rangaswamy, A. 2003, *Marketing Engineering – Computer Assisted Marketing Analysis and Planning*, Prentice Hall 3. Ulrich, K.T. and Eppinger, S.D., 2020, *Product Design and Development*, 7th Edition, McGraw-Hill 4. *The Journal of Product Innovation Management*, Elsevier Science Inc.	

Subject Description Form

Subject Code	ISE431
Subject Title	Engineering Costing and Evaluation
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with knowledge of 1. the major types of costing methods and budgeting operations that support engineering cost analysis and project/operations planning and control; 2. concepts and techniques of economic analysis that can be applied to solving engineering and business problems; 3. methods that evaluate/support engineering projects and operations.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. apply costing principles and techniques to the planning and control of profitability in the production of goods and services in the engineering industry; b. prepare budgets and relate them to production plans for performance evaluation; c. apply the principles and techniques of economic analysis to the appraisal of investment alternatives; d. understand the foregoing principles and apply the foregoing techniques in the evaluation of engineering projects.
Subject Synopsis/ Indicative Syllabus	1. <u>Costing in the Production of Goods and Services in the Engineering Industry</u> Production and operation costs; job and product costing; process costing; absorption of overhead; cost behaviour and cost estimation; functional-based costing; activity-based costing; cost database and its maintenance; learning curve; cost-volume-profit analysis; pricing and profitability analysis; make-or-buy decisions.

2. Performance Planning and Evaluation

Enterprise strategy and budget setting; standard costing and variance analysis; flexible budgeting and variance analysis; production plan; cash budget; profit plan; master budget; performance evaluation; balanced scorecard and its implementation.

3. Engineering and Project Economic Analysis

Cost and benefit concepts; worth measures and efficiency measures; time value of money; capital budgeting and investment appraisal decisions; financing methods; cost of capital; evaluation of project alternatives using discounted cash flow methods; opportunity cost; lease versus buy decisions; replacement and timing decisions; effects of tax and depreciation; sensitivity and risk analysis in project evaluation.

4. Engineering Evaluation

Technological forecasting; evaluation of technological innovation; environmental cost evaluation and management. Process and the social context of engineering decision making.

Teaching/Learning Methodology

A mixture of lectures, tutorial exercises, and case studies is used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance the students' self-learning abilities. Tutorials, projects, and case studies are conducted mainly as group activities so that students can discuss and practice the materials learnt in the class. This also stimulates further thinking about the materials together with the factors to be considered in solving problems related to the subject.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1. Continuous assessment (Assignments/ Projects/Case studies)	40%	✓	✓	✓	✓		
2. Examination	60%	✓	✓	✓	✓		

	Total	100%	
	The assignments, projects, and case studies are designed to assess students' capability to synthesise and apply the concepts and skills learnt in analysing and solving engineering costing and evaluation problems. The final examination assesses students' understanding of the concepts and their ability to apply the skills learnt to analysing and solving problems related to the subject.		
Student Study Effort Expected	Class contact:		
	▪ Lectures 2 hours/week for 13 weeks		26 Hrs.
	▪ Tutorials/Case studies 1.5 hours/week for 8 weeks + 1 hour		13 Hrs.
	Other student study effort:		
	▪ Studying and self-learning		58 Hrs.
	▪ Assignment and report writing		26 Hrs.
	Total student study effort		123 Hrs.
Reading List and References	1. Hartman, J C 2007, *Engineering Economy and the Decision-Making Process*, Upper Saddle River, N.J.: Prentice Hall 2. Chan, S P 2012, *Fundamentals of Engineering Economics*, Upper Saddle River, N.J.: Pearson/Prentice Hall 3. Horngren, C T, Datar, S M & Foster, G 2011, *Cost Accounting: a Managerial Emphasis,* Upper Saddle River, NJ: Pearson/Prentice Hall 4. Rogers, M & Duffy, A 2012, *Engineering Project Appraisal,* Oxford: Blackwell Science		

Subject Description Form

Subject Code	ISE445
Subject Title	Capstone Project
Credit Value	6
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject aims to 1. provide students with the opportunity to have an in-depth exploration of a particular topic in Product Engineering with Marketing (PEM); 2. develop the skills of students so that they may work effectively on their own while demonstrating initiative to perform tasks and within constraints; 3. develop the ability of students in preparing, presenting, and defending a project report.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. define a problem by understanding its background, then set the objectives and deliverables of a project that addresses a significant issue relevant to the goal pursued by the student; b. develop and implement the strategies and methodology to achieve the project objectives within a given set of constraints; c. communicate effectively with stakeholders of the project and work independently to achieve the project objectives and produce the deliverables; d. prepare, present, and defend a clear, coherent, and succinct project report.
Subject Synopsis/ Indicative Syllabus	Each student is required carry out an individual project in an area relevant to the discipline of PEM. Details of the work will depend on the subject of the project that the student works on.
Teaching/Learning	This subject is conducted using an integrated project-based learning approach. Students work on an individual project selected or proposed in the stream area

<table>
<tr><td>Methodology</td><td>of PEM. An academic supervisor is assigned to guide and monitor the progress of the project. There is a final project presentation and each student is required to submit a project report.

Throughout the duration of the project, supervisors make themselves available for discussions with their students at meetings arranged at mutually convenient times. To aid students in organizing their project in a systemic manner, students are required to submit a progress report, which provides detailed records of the various stages of project work.

The proposed project defined by the student and/or the supervisor should be in an area relevant to the discipline. The project will be used as a vehicle for the student to integrate his/her knowledge gained in the programme. In order to achieve the subject learning outcomes, it is not appropriate to have projects mainly focused on literature review or pure computer programming. Depends on the nature of the project, the work covers by the students may include the background and scope of the project; literature review, field works; experiments; data collection; case studies; methodology; discussion; and conclusion.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1.Continuous assessment</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Progress report</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Oral presentation</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>4. Report</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
Performance of the student’s drive and diligence in carrying out his/her project work is assessed by the project supervisor. This provides a reflection of the student’s creativity and self-motivation demonstrated throughout the project.

The progress report is assessed by the co-examiner, an individual who is generally not involved in supervising the student. The assessment of the progress report reflects the student’s performance in pursuing the project work from a third person’s point-of-view.

The oral presentation is assessed by both the supervisor and the co-examiner. The assessment is designed to test the student’s ability in marshalling his/her</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">thoughts clearly and in presenting finished output, which had been logically and succinctly executed on various aspects of the product analyses.

The individual written report is assessed by both the supervisor and the co-examiner. The students use the written report to demonstrate their performance. Written reports reflect the depth of the student's comprehension of the subject, as well as the ability of the student to logically present his/her analyses in a written format.</td></tr>
<tr><td rowspan="8">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Project briefing</td><td>2 hrs.</td></tr>
<tr><td>▪ One day per week is allotted for analyses and investigations of individual projects. Students are expected to work on this for at least</td><td>78 hrs.</td></tr>
<tr><td>Other student study effort</td><td></td></tr>
<tr><td>▪ Discussion with supervisors</td><td>16 hrs.</td></tr>
<tr><td>▪ Preparation for oral presentation</td><td>38 hrs.</td></tr>
<tr><td>▪ Preparation for report writing</td><td>80 hrs.</td></tr>
<tr><td>Total student study effort</td><td>214 hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">Different references are recommended by different project supervisors depending on the nature of the individual project concerned. Recommended texts related to the generic skills for carrying out a student project are as follows:

1. Peck, John and Coyle, Martin 2012, The Student's Guide to Writing: Spelling, Punctuation and Grammar, 3/e, Palgrave MacMillan

2. Cottrell, Stella 2011, Critical Thinking Skills: Developing Effective Analysis and Argument, 2/e, Palgrave MacMillan

3. http://resource.unisa.edu.au/file.php/1572/Harvard_referencing_guide_UniSA_Jan_2013.pdf</td></tr>
</table>

Subject Description Form

Subject Code	ISE449
Subject Title	Mobile Technologies for Logistics Systems
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject aims to 1. enable students to understand the concept of mobile technology and to apply relevant techniques to solve traditional logistics process problem; 2. provide students with knowledge in applying latest commercial available hardware and software technologies to enable efficient information capturing, processing and exchanges among various business entities in today's supply chain and logistics environment; 3. provide a working knowledge of latest information and communication technology and an interactive environment in which students can learn and practice their skills in mobile applications.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the existing logistics operations and to design process improvement procedures in various supply chain areas; b. apply appropriate mobile devices and data capturing techniques to improve data exchange and information flow; c. integrate existing logistics infrastructure into mobile technologies to form a more effective system; d. identify the advantages and limitations of mobile technologies in various areas.
Subject Synopsis/ Indicative Syllabus	1. <u>Basics of Mobile Technologies</u> Mobility of data; Industry classifications of mobile technologies; Mobile network infrastructure concepts and capabilities.

<table>
<tr><td></td><td>
2. <u>Information Exchange, Identification, Location and Tracking Techniques</u>
Identification techniques (Barcode/Smartcard/RFID); Logistics management requirements; Wireless Network Services (WAP/SMS); Personal Digital Assistant (PDA) business tools; Image capture and transmission using camera phones; Video streaming and conferencing.

3. <u>Workflow Improvement</u>
Business automation tools; Mobile functionality requirements for productivity support; Personal productivity tools; Instant messaging using mobile technology; Technology integration requirements.

4. <u>Mobile Applications in Different Areas</u>
Integration of message delivery services; Export/import process enhancement; Mobile security; Personalization of consumer profiles; Mobile entertainment; Mobile platform functionality; Market growth attributes and projections.
</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mix of lectures, tutorials, case studies, a mini project, and laboratory exercises is used to deliver the modules in this subject. Case studies, largely based on real cases, are used to demonstrate to students how the mobile techniques can be applied to improve the existing logistics operations.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Laboratory Exercise</td><td>30%</td><td></td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Case Study</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>3. Mini Project</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>4. Test</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
Laboratory exercises provide hands-on experiences to the students. They are good tools to measure the students' practical skills in applying principles related to mobile technology. The case study and mini project give good opportunities for students to share their ideas and evaluate their knowledge in problem solving in different supply chain areas. The test is used to measure
</td></tr>
</table>

	their individual performance in this subject.	
Student Study Effort Expected	Class contact:	
	▪ Lecture/Tutorial 3 hours/week for 9 weeks	27 Hrs.
	▪ Laboratory/Case Study 3 hours/week for 4 weeks	12 Hrs.
	Other student study effort:	
	▪ Self Study/Group Discussion for Mini Project, Case Study and Laboratory Exercise	30 Hrs.
	▪ Preparation for Presentation and Write-up Assignment	28 Hrs.
	▪ Preparation for Test	15 Hrs.
	Total student study effort	112 Hrs.
Reading List and References	1. Hedgepeth WO 2007, *RFID Metrics: Decision Making Tools for Today's Supply Chains*, CRC Press 2. Sadeh N 2002, *Mobile Commerce: Technologies, Services and Business Models*, Wiley 3. Anderson C 2001, *GPRS and 3G Wireless Applications*, Wiley 4. Landt J 2001, *Shrouds of Time The history of RFID*, AIM Inc. 5. Buckingham S 2000, *Success 4 SMS*, Mobile Lifestreams 6. Rankl W and Effing W 2000, *Smart Card Handbook*, 2nd edn, John Wiley and Sons Australia Ltd.	

Subject Description Form

Subject Code	ISE457
Subject Title	Business Process Management
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject aims at enabling students to 1. appraise the importance of structuring and measuring business processes in an organization; 2. identify and build business processes for various business applications; 3. apply appropriate measures to assess, report and improve the performance of business processes.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. describe the basic concept of business process management; b. assess the organizational implications of functional and process-centric management; c. illustrate the process of designing and developing a Business Process Management Solution; d. configure and manage a business process management system with knowledge of the scope and limitations of such tools; e. develop an overall understanding of team building and governance of processes in an organization.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction to Business Process Management</u> Definition of business process management; Process and workflow life cycle; Transformation of a functional enterprise to a process-centric enterprise; Business value and risk of process automation. 2. <u>Business Process Management Solution Development</u>

<table>
<tr><td></td><td>Business process management solution architectures; Business process analysis; BPM Process Development; BPM reporting and monitoring. BPM and application integration; BPM and Robotic Process Automation; Configuration of business process management solutions; BPM software vendor products; and Evaluation and selection.

3. <u>Technology for Business Process Management</u>

Process Modeling Standards - Business Process Modeling Notation (BPMN); Process repository and Business rules systems.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mix of lectures, laboratories, tutorial exercises, and projects is used to deliver the various topics in this subject. Practical problems and case studies are raised as a focal point for discussion in tutorial classes. Laboratory session(s) are also used to illustrate and assimilate some fundamental principles of business process management, some of which are covered in a problem-based format and exercises to enhance the learning objectives. Others are covered through directed study in order to enhance the students' ability of "learning to learn." The subject stresses creative thinking, and problem- solving approach. Local and overseas case studies are also included to reinforce understanding and enhance practicality.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><th>Specific assessment methods/tasks</th><th>% weighting</th><th>a</th><th>b</th><th>c</th><th>d</th><th>e</th></tr>
<tr><td>1. Workshop Exercise</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Forum discussions</td><td>10%</td><td>✓</td><td>✓</td><td></td><td></td><td>✓</td></tr>
<tr><td>3. Test</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>4. Project</td><td>30%</td><td></td><td></td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>5.In-class assessments</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
The coursework consists of assignments with individual and group components, usually up to two individual tests. All assessment components require students to apply concepts delivered in lectures to real life cases. The assignments require students to conduct background research on BPM and identify, among others, potential applications and benefits. Short quizzes are also used to test student's understanding of the taught concepts and ability to apply BPM to stated situations. In-class assessments are based on student's</td></tr>
</table>

	performance in asking questions and responding to questions and participating in discussions in class. As they work in groups, students must tackle a project by identifying the problem structure, representing the processes, presenting and simulating the process flow, as well as identifying innovations and potential improvements in the current design.	
Student Study Effort Expected	Class contact:	
	▪ Lecture (In-person & Online)	21 Hrs.
	▪ Tutorial/Case Study/Guest presentation(s)	9 Hrs.
	▪ Online Bulletin Board	6 Hrs.
	▪ Laboratory	3 Hrs.
	Other student study effort:	
	▪ Tackling of assignments and preparation for tests	35 Hrs.
	▪ Background research and project	40 Hrs.
	Total student study effort	114 Hrs.
Reading List and References	Reference Books 1. Burton, R 2001, B*usiness Process Management: Profiting from Process*, Sams, Indianapolis 2. Smith, H and Fingar, P 2006, *Business Process Management*: *The Third Wave*, Megan Kiffer Press, Tampa Journal 3. Bradford X 2005, *Business Process Management Journal*, England: MCB University Press	

Subject Description Form

Subject Code	ISE461
Subject Title	Green Legislation and Supply Chain Logistics
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Knowledge of supply chain management
Objectives	The subject relates green practices to supply chain management. Students learn how green legislation has evolved over the years, and the importance and impacts of environmental regulations with respect to supply chain management. In this connection, the environmental impacts of supply chains are discussed. In addition, the course introduces related methodologies and tools for analysing, designing, and improving supply chains in a green context.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. understand recent trends in green legislation with respect to supply chains; b. understand the environmental impacts of supply chains and hence the need for green supply chains; c. apply related methodologies and tools to the design of green supply chains and the improvement of existing supply chains; d. integrate green practices, based on green legislation, into supply chain activities for sustainable development; e. have a critical and analytical perspective that enhances their appreciation and independent judgment of green supply chain design; f. understand the importance of green legislation and thus comply with green regulations in their future professional career.
Subject Synopsis/ Indicative Syllabus	1. <u>Overview of Green Supply Chain Management</u> Recent trends in green supply chain management; environmental impacts of supply chains, the green supply chain as a competitive advantage in today's business environment.

<table>
<tr><td></td><td>2. <u>Evolution of Green Legislation</u>

Drivers of green supply chains; recent trends in green legislation; RoHS, WEEE, and REACH; need for and importance of green legislation related to supply chain management.

3. <u>Life-Cycle Approach to Green Supply Chains</u>

Life-cycle assessment as a tool; greening of supply chains; green supply chain design.

4. <u>GreenSCOR model</u>

Supply chain operations reference (SCOR) model; Supply Chain Council; cross-industry standard and diagnostic tool for supply-chain management; GreenSCOR as a focused model; applications of the GreenSCOR model to a green supply chain.

5. <u>Greening Supply Chains by Reverse Logistics</u>

Reverse logistics; comparison with traditional forward logistics flow; effective means to reduce operational costs; waste generated in supply chain processes; reverse logistics case studies.

6. <u>Sustainable Development</u>

Sustainable development with respect to supply chain management.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures and discussions of industrial case studies in small groups in tutorial sessions is employed. This interactive approach offers better opportunities for students to gain a theoretical understanding of the principles and hands-on experience. Students present the results of their discussion of selected cases in assigned project work either as individuals or in teams. This helps the students to develop a critical and analytical perspective to enhance their appreciation and independent judgment of green supply chain design. Industry experts may be invited to speak on a specific area such as the manufacture of electronics, printed circuit boards, and electrical appliances. This helps the students to understand the recent trends in green legislation with respect to supply chains, and to understand green practices and green supply chains for sustainable development in the real world.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td></tr>
</table>
</td></tr>
</table>

	1. Mid-term test	20%	✓	✓			✓	
	2. Reflective Essay	5%				✓		✓
	3.Take-home assignment	10%			✓		✓	
	4. Mini project (oral presentation and report)	20%	✓	✓	✓	✓		✓
	5. Examination	45%		✓	✓	✓	✓	
	Total	100%						

The test and reflective essay are designed to facilitate students to reflect on and apply the knowledge gained of green legislation to real-life cases and industrial companies.

The take-home assignment is designed to assess students' ability to apply different logistics techniques in building up and enhancing a green supply chain management system in a typical company.

The integrated application-oriented group project is designed to facilitate students to acquire knowledge of the different areas of green legislation and supply chain logistics in various industrial sectors through team work (presentation and report).

The final written examination is designed to assess students' understanding of the topic. Students are required to analyze problem-based and case-based questions/scenarios and to present concepts clearly and logically.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures 2 hours/week for 11 weeks	22 Hrs.
	▪ Tutorials 1 hour/week for 11 weeks	11 Hrs.
	▪ Industrial case studies 3 hours/week for 2 weeks	6 Hrs.
	Other student study effort:	
	▪ Preparation for tests and site visit (s)	12 Hrs.
	▪ Execution of the group project	27 Hrs.
	▪ Reading background information in preparation for	21 Hrs.

	tutorials; presentation and report writing	
	▪ Preparation for case studies, the take-home assignment, application software	27 Hrs.
	Total student study effort	126 Hrs.
Reading List and References	Recommended 1. Sarkis, J., *Greener manufacturing and Operations*, Greenleaf Publishing Limited, latest edition. 2. Taylor, D. and Brunt, D. *Manufacturing Operations and Supply Chain Management: The LEAN Approach*, Thomson Learning, latest edition. Supplementary 1. Plenert, G., *How to Create an Integrated World-Class Lean SCM Environment*, In Reinventing Lean, Chapter 10, pp. 290-294, Butterworth-Heinemann, latest edition. 2. Van Hoek, R. I. 2001, *Case Studies of Greening the Automotive Supply Chain Through Technology and Operations*, International Journal of Environmental Technology and Management, 1(1-2), 140-163 3. Sarkis, J. 2003, *A Strategic Decision Framework for Green Supply Chain Management*, Journal of Cleaner Production, 11(4), 397-409 Journals 1. Logistics Information Management 2. Journal of Operations Management 3. Supply Chain Management: An International Journal. Websites 1. Supply Chain Council: http://www.supply-chain.org 2. Supply Chain Management for Environmental Improvement: http://www.pprc.org/pubs/grnchain	

Subject Description Form

Subject Code	ISE4003
Subject Title	Automation Technology
Credit Value	3
Level	4
Pre-requisite	HKDSE Physics, or Foundation Physics I and II (AP00002 & AP00003)
Objectives	This subject provides students with 1. the basic to implement low cost automation systems; 2. the ability to evaluate the feasibility and effectiveness of alternative automation strategies; 3. the principle of industrial robots and programmable logic controllers.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. implement low cost automation systems using mechanical and electrical means; b. program industrial robot, programmable logic controller and microprocessors programming for industrial system control; c. control DC motor, stepper motor and servo motor for industrial applications.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction of Fundamental Automation Devices</u> Sensors: temperature, force, pressure, proximity, light sensors, etc. Actuators: motors, pneumatic devices, etc. Simple Machine Vision Applications. 2. <u>Motor Control for Industrial Applications</u> DC motor control using Pulse Width Modulation(PWM) technique, Stepper motor control, Servo motor control, Industrial applications. 3. <u>Programmable Logic Controllers</u> Introduction to programmable logic. Applications of microprocessors and

<table>
<tr><td></td><td>computer to industrial system control.

4. <u>Automated Assembly Design</u>

Assembly process automation: classification of assembly systems, transfer systems, feeding mechanisms and robots.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The learning method of this subject consists of a series of class lectures and laboratory exercises. Emphasizing is put on the developments of practical hand-on skills in automation with theoretical backup. The lectures facilitate students in understanding the fundamental concepts, working principles and techniques in related to automation while laboratory exercises are incorporated to give students practical familiarity on relevant areas.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>Assignment</td><td>20%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Test</td><td>10%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Laboratory Exercise</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Final Exam</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Each laboratory exercise would be divided into two groups; the individual report can be hand-in afterwards. Tutorials would be provided to students to improve their understanding of the subject materials and final examination will be given to assist the assessment of students' learning outcomes.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td colspan="2">Class contact:</td><td></td></tr>
<tr><td>▪ Lecture/Seminar</td><td>2 hours/week for 11 weeks</td><td>22 Hrs.</td></tr>
<tr><td>▪ Tutorial</td><td>1 hour/week for 11 weeks</td><td>11 Hrs.</td></tr>
<tr><td>▪ Laboratory</td><td>3 hours/week for 2 weeks</td><td>6 Hrs.</td></tr>
<tr><td colspan="2">Other student study effort:</td><td></td></tr>
<tr><td colspan="2">▪ Self Study</td><td>32 Hrs.</td></tr>
<tr><td colspan="2">▪ Laboratory Report/Tutorial</td><td>50 Hrs.</td></tr>
</table>
</td></tr>
</table>

	Total student study effort	121 Hrs.
Reading List and References	1. Boothroyd, G, Knight, W, Dewhurst, P 2010, *Product Design for Manufacture and Assembly*, Third Edition (Manufacturing Engineering and Materials Processing), CRC Press 2. Kilian C T 2004, *Modern Control Technology*, 3rd Edition, Thomson Delmar Learning 3. Clarence, W. de Silva 2007, *Sensors and Actuators: Control System Instrumentation*, CRC Press 4. Ebel, F, Idler, S, Prede, G, Scholz, D 2008, *Fundamentals of Automation Technology*, Festo Didactic GmbH & Co. KG, 73770 Denkendorf, Germany	

Subject Description Form

Subject Code	ISE4004
Subject Title	Enterprise Resources Planning
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject will provide students with 1. the fundamental principles of Enterprise Resources Planning (ERP); 2. the major components in an ERP system and the relationship between these components; Selection, Evaluation and Implementation of ERP; 3. the basic skills in developing corporate strategies.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. identify major components in an ERP system and conduct feasibility of ERP; b. develop effective corporate strategies and to implement these strategies using ERP.
Subject Synopsis/ Indicative Syllabus	The topics of this syllabus are: 1. Enterprise Systems Strategic inventory management; collaborative planning; forecasting; replenishment. 2. Enterprise Strategy Enterprise and corporate strategies; strategic management building; implementation techniques. 3. Enterprise Resources Planning (ERP) Solutions Distribution items and purchased material, manufactured items, sales and operation planning, sales order processing, warehouse management, production order processing, multisite operations.

<table>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, seminars, and case studies will be used to illustrate and teach the fundamental principles of Enterprise Resources Planning (ERP). The use of a typical enterprise system (such as Microsoft Dynamics) and an enterprise simulator will enable students to solve problems in a simulated enterprise environment. Such environment enables students to develop effective corporate strategies and to implement these strategies in an organizational context. It also enables to improve students' strategic management skills and to increase the quality of their business decision making.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td></td><td></td><td></td><td></td></tr>
<tr><td>1. Laboratory work</td><td>35%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>2. Assignment</td><td>30%</td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>3. Quiz</td><td>20%</td><td>✓</td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>4. Case Study</td><td>15%</td><td></td><td>✓</td><td></td><td></td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
The quiz is designed to assess students' depth of knowledge in recognizing the complexity of a modern enterprise. The case study is designed to appraise students' performance in presenting the concepts of the enterprise systems and strategy. The laboratory work and assignments are designed to measure students' understanding in corporate strategy development and to reflect their performance in the simulated enterprise simulator.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures/Tutorials</td><td>21 Hrs.</td></tr>
<tr><td>▪ Seminar/Case Studies</td><td>18 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Preparation Work for Laboratory and Assignment</td><td>30 Hrs.</td></tr>
<tr><td>▪ Quiz preparation</td><td>21 Hrs.</td></tr>
</table>
</td></tr>
</table>

	▪ Case Study preparation	12 Hrs.
	Total student study effort	102 Hrs.
Reading List and References	1. Hamilton, S 2009, *Managing Lean Manufacturing Using Microsoft Dynamics AX 2009*, Visions First 2. Hamilton, S 2009, *Managing Your Supply Chain Using Microsoft Dynamics AX 2009*, McGraw-Hill 3. DeWit, B & Meyer, R 2003, *Strategy: Process, Content,* 3rd edn, International Thomson Business Press 4. Blanchard, BS 2003, *Logistics Engineering and Management,* 6th edn, Prentice Hall Inc., Upper Saddle River, N.J. 5. Stock, R. & Lambert M. 2001, *Strategic Logistics Management,* 4th edn, McGraw-Hill Publishing Company	

Subject Description Form

Subject Code	ISE4005
Subject Title	Eco-design and Manufacture
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject is aimed to 1. provide students with the recent global trends and significance eco-design and manufacture in industry; 2. ensure that students are aware of the regulatory requirements of European Union (EU), China, USA, Japan, and other regions on eco-design and manufacture; 3. provide students with a holistic approach to eco-design and manufacture, and to address issues such as: environmental impact; product eco-design, use, and life; technology capabilities; and business benefits.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. address issues relating to recent global trends and significance of eco-design and manufacture in industry; b. be aware of the regulatory requirements of European Union (EU) on eco-design and manufacture; c. take a holistic approach to eco-design and manufacture, addressing and relating elements like: environmental impacts; product eco-design, use and life; technology capabilities; and business benefits; d. understand and apply the methods to reduce environmental impacts throughout the whole product life cycle by better product eco-design and use.

Subject Synopsis/ Indicative Syllabus	1. Introduction to Eco-design and Manufacture Sustainable product development, global environmental concerns, impact on merchandise trade, eco-product market trends, business benefits and opportunities; driving forces of eco-design and manufacture, role of designers and engineers. 2. Environmental Considerations in Product eco-design Stages of product development process in eco-design; Materials, manufacturing and packaging, use, end-of-life and disposal issues; design for disassembly and recycling; Recycling Potential Indicator (RPI); the six RE-philosophy. 3. Global and regional regulatory requirements on Eco-design and Manufacture Eco-product Laws in Japan; Eco- product Legislations in the US; EU Directives: Waste of Electrical and Electronic Equipment (WEEE) and Restriction of Hazardous Substances (RoHS) and EcoDesign framework for Energy Using Product (EuP) and Energy-related Product (ErP); China Environmental Laws. 4. Environmental Assessment of Products and related tools and techniques Life Cycle Assessment (LCA) and streamlined methods, e.g. MET, Philip's Fast-Five; Software tools in LCA, e.g. SimaPro and Gabi; Integrated Product Policy (IPP); "Green Mark", "Eco-labels" and eco-labeling schemes and programmes. 5. Environmental Management Systems International Standards (ISO14000), management of waste materials and chemical substances; Registration of Chemicals in European Union; Green supply chain management. 6. Industrial Examples in Eco-design and Manufacture Eco-design of electrical appliances, examples of green-manufactured electronic products; alternate and emerging green technologies.
Teaching/Learning Methodology	In the lectures, the general principles of the syllabus topics will be presented and developed. In the case studies, students will develop and apply these general principles through student centered learning activities under the guidance of the lecturer. In the seminars, they will be able to learn and appreciate the latest developments of the subject, particularly its practice in

various industries in Hong Kong and the Pearl River Delta region.

The pace of change in the subject area is faster than conventional subject revision procedures can effectively accommodate. Moreover some of the techniques, technologies, and practices are highly specialized and unique to different industries. As a consequence, the material taught during the early years of the subject may become outdated by the time the student graduates. To accommodate these circumstances, this level-4 subject serves two separate functions. Firstly, it is to ensure that students are aware of the overall global trends in eco-design and manufacture, its regulatory requirements and business opportunities with compliance. Secondly, it is to prepare students for subsequent in-depth study in selected topics relating to techniques, methodologies and technologies in the subject. Where appropriate, seminars and/or visits will be arranged for students to get wider exposure.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b	c	d		
1.Tutorial Exercises	20%	✓	✓	✓	✓		
2. Take home assignment	10%			✓	✓		
3. Test	20%	✓	✓				
4. Examination	50%	✓	✓	✓	✓		
Total	100%						

Tutorial exercises are designed to facilitate students to reflect and apply the knowledge on eco-design and manufacture to practical problems and real-life cases.

Take home assignment is designed to facilitate students to address problem by taking a holistic approach to eco-design and manufacture, and to reduce environmental impacts throughout the whole product life cycle by better product design and use.

Test is designed to be aware of the regulatory requirements of European Union (EU) on eco-design and manufacture, and to address issues relating to recent global trends and significance of environmental eco-design and manufacture in industry.

	Written examination is designed to facilitate students to show their understanding of the topic through analyzing problem-base and case-base questions/scenario in order to present their concepts clearly and logically.	
Student Study Effort Expected	Class contact:	
	▪ Lecture 2 hours/week for 11 weeks	22 Hrs.
	▪ Guided Learning/Case Studies 2 hours/week for 7 weeks	14 Hrs.
	▪ Seminars 1.5 hours/week for 2 weeks	3 Hrs.
	Other student study effort:	
	▪ Preparation for reading guided learning background information and case studies	50 Hrs.
	▪ Preparation for seminars and take home assignment and application software	36 Hrs.
	Total student study effort	125 Hrs.
Reading List and References	1. Davis M.L. and Masten S.J., *Principles of Environmental Engineering and Science*, McGraw-Hill 2. Ulrich K.T. and Eppinger S.D., *Product Design and Development*, McGraw-Hill, latest edn 3. J. Rodrigo, *Electrical and Electronic: Practical Design Guide*, F. Castells University Rovira I Virgili, Tarragona, Spain, latest edn. 4. H. Lewis and J. Gertsakis, *Design + Environment: A Global Guide to Design Greener Goods*, Greenleaf Publishing Ltd., latest edn 5. European Union Directives on WEEE, RoHS and EuP, latest edn	

Subject Description Form

Subject Code	ISE4008
Subject Title	Individual Project
Credit Value	6
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	While the specific objectives of individual projects may vary from one project to another, students are expected to develop the following generic skills through the learning experience of working on an individual project under the guidance of a supervisor: 1. Skills to obtain information needed to formulate a problem, and to devise and implement strategies that will produce a solution. 2. Skills to apply knowledge, procedures (principles, techniques and methods), and to understand their limitations in problem identification, data analysis and formulation of logical observations and or solutions. 3. Skills to work effectively as an individual using one's own initiative and within constraints. 4. Skills to prepare, present, and defend a project report effectively.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. understand the background, as well as define the objectives (time, cost and technical requirements) and deliverables of a project that address a significant issue relevant to the award pursued by the student; b. formulate strategies and methodologies to achieve the project objectives within the constraints of a given situation; c. select, apply, integrate and, ideally, extend available knowledge, procedures and tools to collect data in performing the needed investigational or design work, and to draw conclusions that address the project objectives; d. communicate effectively with stakeholders of the project outputs and work independently to produce, within applicable constraints, optimal solutions that address the project objectives;

	e. prepare, present, and defend a clear, coherent and succinct report.
Teaching/Learning Methodology	Throughout the duration of the project, the supervisor provides guidance and monitors the progress of the project. The progression of the project typically follows the following indicative stages: **Project Definition** – in this stage, the student will work in consultation with the project supervisor to draw up a project plan addressing issues such as: ● Background of the project ● Aims and objectives ● Deliverables ● Project scope and applicable constraints ● Coverage of literature review ● Methodologies to be considered ● Project schedule **Project Execution** – This is the major part of the project. After the project requirements are defined, the student will work independently under the guidance of the project supervisor towards the achievement of the project objectives and produce the project deliverables in a given situation. On his own initiative, the student will meet the project supervisor regularly to review progress and discuss issues of the project. In this stage, the student should demonstrate: ● Adherence to the schedule ● Initiatives to acquire and synthesize knowledge, collect the needed data, and solve problems ● Tenacity, resourcefulness, critical thinking and creativity in achieving project objectives ● Systematic documentation of data, design and results throughout the process The student is required to maintain a project workbook that records the meetings held and summarizes the work performed in this stage. **Project Report** – On completion of the project, the student will disseminate the results to his peers and examiners to review. The major deliverables of

<table>
<tr><td></td><td>this stage are:
A written project report (softcopy and hardcopy)
An oral presentation
Taking questions and comments in a question-and-answer session
The proposed project defined by the student and/or the supervisor should be in an area relevant to the discipline. The project will be used as a vehicle for the student to integrate his/her knowledge gained in the programme. In order to achieve the subject learning outcomes, it is not appropriate to have projects mainly focused on literature review or pure computer programming. Depends on the nature of the project, the work covers by the students may include the background and scope of the project; literature review, field works; experiments; data collection; case studies; methodology; discussion; and conclusion.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="5">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td></tr>
<tr><td>▪ Progress</td><td>15%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>▪ Workbook</td><td>10%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>▪ Final Report</td><td>50%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>▪ Oral Presentation</td><td>25%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="5"></td></tr>
</table>
The workbook is designed to assist the project student to organise and document, in summary form, his project work in a systematic manner. This workbook, to be submitted at the end of Semester 1, will be commented by the Project Supervisor and then assessed by a co-examiner of the project. The final report should be a clear, coherent and succinct document that disseminate the background, problem statement, objectives and expected deliverables, literature review, methodologies, project execution, analysis and, where appropriate, design, as well as discussion and conclusions. Thus, the written report and the oral presentation are assessed by the project supervisor and a co-examiner to determine the achievement of all the learning outcomes of the project work.

The project supervisor, who communicates regularly with the student, will assess the student’s progress during project execution.</td></tr>
<tr><td>Student Study</td><td>Class contact:</td><td></td></tr>
</table>

Effort Expected	▪ Briefing on Final Year Project	2 Hrs.
	▪ Information Literacy Seminar	2 Hrs.
	Other student study effort:	
	▪ Meetings with Supervisor and/or project stakeholders 2 Hrs. × 13	26 Hrs.
	▪ Literature review/field work/experiments	120 Hrs.
	▪ Analysis/report writing	90 Hrs.
	Total student study effort	**240 Hrs.**
Reading List and References	1. Blaxter, L., et al. 2001, *How to Research*, 2nd edn, Open University Press 2. Bryman, A. 1989, *Research Methods and Organization Studies*, Unwin Hyman 3. Campbell, W.G., et al. 1990, *Forms and Style: Thesis, Reports, Term Papers*, 8th edn, Boston, Houghton Mifflin 4. Murray, Rowena 2002, *How to Write a Thesis*, Open University Press	

Subject Description Form

Subject Code	ISE4009
Subject Title	Advanced Manufacturing Technology
Credit Value	3
Level	4
Pre-requisite/~~Co-requisite/Exclusion~~	(ISE3006 Materials and Processes Selection)
Objectives	This subject provides students with 1. an understanding of specific advanced and emerging manufacturing technologies employed in modern industry with an emphasis on nano-micro fabrication; 2. a basic understanding of the capabilities, limitations, and productivity of these manufacturing technologies.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. comprehend the merits and limitations of the taught technologies, in terms of flexibility, productivity, quality, profitability, etc. b. identify suitable manufacturing technologies for the production of some typical nano-micro components/products.
Subject Synopsis/ Indicative Syllabus	1. Overview of Some Advanced Manufacturing Technologies Outline of modern processes for the production of precision and/or micro components/products. Ultra-precision machining. Physicochemical machining processes. Micro-machining. Computer aided machining (CAM). Physical and chemical vapour deposition technologies. Lasers based manufacturing processes. Rapid prototyping. 2. Precision Removal Processes Ultra-precision machining, principles and applications, precision plastic optical products. High-speed machining. CAM. Micro electric discharge machining. Physicochemical machining. Micro-components. 3. Surface Engineering

Chemical and physical vapour deposition (CVD, PVD), capability and accuracy, distortion and residual stresses, applications in optical and electronic devices.

4. Laser Technology

   Fundamentals of lasers. Industrial lasers. Laser materials processing for photovoltaic applications, bio-medical applications, micro-mould and die manufacture, MEMS.

5. Rapid Prototyping Technology

   Commercial RP techniques and their applications: stereolithography, selective laser sintering, laminated object manufacturing, fused deposition modeling, solid ground curing, and ink jet printing techniques.

Teaching/Learning Methodology

The subject is taught through a combination of lectures, laboratory exercises, and tutorial assignments integrated with a mini-project. The lectures introduce the student to in-depth knowledge in the current practices of advanced manufacturing technologies. The laboratory and tutorial exercises provide opportunities for student to learn and practice with guiding materials. Mini-projects promote students' ability to conduct a literature search and their self-learning skills.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed					
		a	b				
1. Assignments	10%	✓	✓				
2. Lab reports	10%	✓					
3. Mini-project	15%	✓	✓				
4. Test	15%	✓	✓				
5. Final examination	50%	✓	✓				
Total	100%						

The assignments, which are administered periodically throughout the course, are designed to facilitate students to reflect on and apply the knowledge learnt.

The laboratory exercises are designed to assess students' problem-solving skills

	in advanced manufacturing technology (learning outcomes (a) and (b)). The mini-projects follow a problem-based format and include case studies, presentations, and report writing. They are designed to facilitate students to acquire the relevant knowledge and demonstrate their ability to apply different technologies. The final examination is used to assess students' individual achievement in all of the intended learning outcomes.	
Student Study Effort Required	Class contact:	
	▪ Lectures	27 Hrs.
	▪ Tutorials	6 Hrs.
	▪ Laboratory	6 Hrs.
	Other student study effort:	
	▪ Guided reading, assignments	32 Hrs.
	▪ Self-study, preparation for test and examination	40 Hrs.
	Total student study effort	111 Hrs.
Reading List and References	1. Leach, Carmignato, Leach, R. K., & Carmignato, Simone. (2021). *Precision additive metal manufacturing* (First ed.). Boca Raton, FL: CRC Press. 2. Gupta, K. (2020). *Surface engineering of modern materials* (Engineering materials). Cham: Springer. 3. To, S., Wang, H., & Lee, W. (2018). *Materials characterisation and mechanism of micro-cutting in ultra-precision diamond turning*. Berlin: Springer. 4. Lawrence, J. (2018). *Advances in laser materials processing: Technology, research and applications* (Second ed., Woodhead Publishing series in welding and other joining technologies). Duxford, England: Woodhead Publishing. 5. Gupta, K. (2018). *Micro and precision manufacturing* (Engineering materials). Cham, Switzerland: Springer. 6. Gupta, K. (2017). *Advanced manufacturing technologies: Modern machining, advanced joining, sustainable manufacturing* (Materials forming, machining and tribology). Cham, Switzerland: Springer.	

	7. Gillespie, & Gillespie, L. K. (2017). *Design for advanced manufacturing: Technologies, and processes*. New York: McGraw-Hill Education. 8. Kwan, Y. (2017). *Laser pulses: Theory, technology, and applications*. Valley Cottage, NY: Scitus Academics LLC. 9. Nowak, R. (2017). *Rapid prototyping technology: Principles and functional requirements*. Valley Cottage, NY: Scitus Academics LLC.

Subject Description Form

Subject Code	ISE4024
Subject Title	Robotics and Automation Systems
Credit Value	3
Level	4
Pre-requisite/~~Co-requisite/Exclusion~~	ISE3019 Industrial Control Systems and Their Applications
Objectives	This subject provides students with 1. the knowledge and skills to develop low cost automation systems; 2. the techniques to evaluate the feasibility and effectiveness of alternative automation strategies; and 3. the principle and application of industrial robots.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. develop low cost automation systems using computational, mechanical, and electrical means; b. apply industrial robots, programmable logic controllers, and microprocessors to develop solutions for robotics and automation systems; and c. apply computing vision control technology for industrial process automation.
Subject Synopsis/ Indicative Syllabus	1. <u>Automation Process</u> Association of smart sensors and system elements to support automated process in systems. Facile methods for machine vision. 2. <u>Motor Control Mechanism for Industrial Applications</u> DC motor control using Pulse Width Modulation (PWM) technique, Stepper motor control, Servo motor control, Linear actuator control in Industrial applications. 3. <u>Programmable Logic Controllers and Automatic Assembly Systems</u>

<table>
<tr><td></td><td>Introduction to programmable logic applications in automation systems. Computer applications in industrial systems. Assembly process automation: classification of assembly systems, transfer and feeding mechanisms, and robotic assembly.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The learning method of this subject consists of a series of class lectures and laboratory exercises. Emphasis is put on development of practical hand-on skills and context in automation with theoretical backup. The lectures facilitate students in understanding the fundamental concepts, working principles and techniques in related to automation processes while laboratory exercises are incorporated to give students practical familiarity on relevant areas.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>Assignment and Quizzes</td><td>25%</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Midterm Exam</td><td>15%</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Laboratory Exercise</td><td>20%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Final Exam</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td></tr>
</table>
Each laboratory exercise would be divided into teams of size of 2 to 3; the individual report can be hand-in afterwards. Tutorials would be provided to students to improve their understanding of the subject materials and final examination will be given to assist the assessment of students' learning outcomes.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td colspan="2">Class contact:</td><td></td></tr>
<tr><td>▪ Lecture/Seminar</td><td>3 hours/week for 7 weeks</td><td>21 Hrs.</td></tr>
<tr><td>▪ Tutorial/Laboratory</td><td>3 hours/week for 6 weeks</td><td>18 Hrs.</td></tr>
<tr><td colspan="2">Other student study effort:</td><td></td></tr>
<tr><td colspan="2">Self-study</td><td></td></tr>
<tr><td colspan="2">▪ Laboratory Reports/Tutorial</td><td>39 Hrs.</td></tr>
<tr><td colspan="2">▪ Preparation for Mid-term Test and Examination</td><td>39 Hrs.</td></tr>
</table>
</td></tr>
</table>

	Total student study effort	117 Hrs.
Reading List and References	1. Boothroyd, G, Knight, W, Dewhurst, P 2010, *Product Design for Manufacture and Assembly*, Third Edition (Manufacturing Engineering and Materials Processing), CRC Press 2. Kilian C T 2004, *Modern Control Technology*, 3rd Edition, Thomson Delmar Learning 3. Clarence, W. de Silva 2007, *Sensors and Actuators: Control System Instrumentation*, CRC Press 4. Ebel, F, Idler, S, Prede, G, Scholz, D 2008, *Fundamentals of Automation Technology*, Festo Didactic GmbH & Co. KG, 73770 Denkendorf, Germany	

Subject Offered by
School of Accounting and Finance

Subject Description Form

Subject Code	AF3625 (for 42470 and 42477)
Subject Title	Engineering Economics
Credit Value	3
Level	3
Exclusion	AF2618
Objectives	This subject aims to equip students with 1. The fundamental concepts of micro- and macroeconomics related to the engineering industry; 2. The fundamental understanding of finance and costing for engineering operations, budgetary planning and control.
Intended Subject Learning Outcomes	**Upon successful completion of this subject, students will be able to:** 1. Understand how the relevant economic factors shape the environment within which an engineering company operates; 2. Evaluate the financial condition of a company; 3. Apply the basic cost accounting techniques in the planning and control of engineering and production activities.
Subject Synopsis/ Indicative Syllabus	Economic Environment of a Firm **Microeconomic Factors** Scarcity, choice and opportunity cost; Demand, supply and price; Profit- maximizing behavior of the firm; Organization of industry: perfect competition and monopoly **Macroeconomic Factors** International trade and globalization Engineering Economics Return on investment; Accounting profit versus economic profit Fundamentals of Budgetary Planning and Control Principle types of budgets for production and service operations; Approaches to budgeting and the budgeting process; Investment and source of finance; Cost of capital; Evaluation of investment alternatives
Teaching/ Learning Methodology	The two-hour lecture each week focuses on the introduction and explanation of key concepts of Engineering Economics. The one-hour tutorial provides students with directed studies to enhance their self-learning capacities. Individual and group activities including discussions and presentations are conducted to facilitate students' understanding and application of the concepts they have learned to tackling real-life problems in Engineering Economics.

<table>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><th rowspan="2">Specific Assessment Methods/Tasks</th><th rowspan="2">% Weighting</th><th colspan="3">Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)</th></tr>
<tr><th>1</th><th>2</th><th>3</th></tr>
<tr><td>Continuous Assessment</td><td>50%</td><td></td><td></td><td></td></tr>
<tr><td>1. In-class activities</td><td>15%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>2. Written assignments</td><td>15%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>3. Test</td><td>20%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Final Examination</td><td>50%</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="3"></td></tr>
</table>
</td></tr>
<tr><td>Student Study Effort Required</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>• Lecture</td><td>26 Hours</td></tr>
<tr><td>• Tutorial</td><td>13 Hours</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>• Study and self-learning</td><td>48 Hours</td></tr>
<tr><td>• Presentation preparation and written assignments</td><td>18 Hours</td></tr>
<tr><td>Total student study effort:</td><td>105 Hours</td></tr>
</table>
</td></tr>
<tr><td>Reading List and References</td><td>Recommended Textbooks

1. Parkin and Bade, Foundations of Microeconomics, 8th ed., Pearson, 2018.
2. Sullivan, Wicks and Koelling, Engineering Economy, 17th ed., Pearson, 2019.

References

1. Robert H. Frank, The Economic Naturalist: Why Economics Explains Almost Everything?, Basic Books, 2011.</td></tr>
<tr><td>Last Updated</td><td>July 2023</td></tr>
<tr><td>Prepared by</td><td>School of Accounting and Finance</td></tr>
</table>

Subjects offered by
Department of Applied Mathematics

Subject Description Form

Subject Code	AMA1110
Subject Title	Basic Mathematics I – Calculus and Probability & Statistics
Credit Value	3
Level	1
Pre-requisite	Nil
Exclusion	Calculus and Linear Algebra (AMA1007) Calculus for Engineers (AMA1130) Calculus (AMA1131) Foundation Mathematics for Accounting and Finance (AMA1500) Calculus (AMA1702)
Objectives	This subject aims to introduce students to the basic concepts and applications of elementary calculus and statistics. Emphasis will be on the understanding of fundamental concepts and the use of mathematical techniques in handling practical problems in science and engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) apply analytical reasoning to solve problems in science and engineering; (b) make use of the knowledge of mathematical/statistical techniques and adapt known solutions to various situations; (c) apply mathematical modeling in problem solving; (d) demonstrate abilities of logical and analytical thinking.
Subject Synopsis/ Indicative Syllabus	Elementary calculus: Limit and continuity, derivatives and their geometric meaning, rules of differentiation including chain rule, Leibniz's rule and L'Hopital's rule, exponential and logarithmic functions, trigonometric functions and their inverses, hyperbolic and inverse hyperbolic functions, applications of differential calculus. Elementary Probability and Statistics: Descriptive statistics, random variables, probability and probability distributions, binomial, Poisson and normal distributions, applications. Population and random samples. Sampling distributions related to sample mean, sample proportions, and sample variances. Concepts of a point estimator and a confidence interval. Point and interval estimates of a mean and the difference

<table>
<tr><td></td><td>between two means.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Basic concepts and elementary techniques of differential and integral calculus and elementary statistics will be taught in lectures. These will be further enhanced in tutorials through practical problem solving.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1.Assignments and mid-term tests</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>
Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess students' level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject focuses on understanding of basic concepts and application of techniques in differential/integral calculus, elementary statistics. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>26 Hrs.</td></tr>
<tr><td>▪ Tutorial</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
</table>
</td></tr>
</table>

	▪ Homework and self-study	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	Chung, K.C. *A Short Course in Calculus and Matrices*, McGraw Hill 2013 Hung, K.F., Kwan, Wilson, Pong, T.Y. *Foundation Mathematics & Statistics*, McGraw Hill 2013 Larson, R., Edwards, B. *Single Variable Calculus*, Brooks/Cole 2012 Walpole, R.E., Myers, R.H., Myers, S.L. Ye, K. *Probability and Statistics for Engineers and Scientists*, Prentice Hall, 2012	

Subject Description Form

<table>
<tr><td>Subject Code</td><td>AMA1120</td></tr>
<tr><td>Subject Title</td><td>Basic Mathematics II –Calculus and Linear algebra</td></tr>
<tr><td>Credit Value</td><td>3</td></tr>
<tr><td>Level</td><td>1</td></tr>
<tr><td>Pre-requisite</td><td>Basic Mathematics I – Calculus and Probability & Statistics (AMA1110)</td></tr>
<tr><td>Objectives</td><td>This subject aims to introduce students to the basic concepts and applications of elementary calculus and statistics. Emphasis will be on the understanding of fundamental concepts and the use of mathematical techniques in handling practical problems in science and engineering.</td></tr>
<tr><td>Intended Learning Outcomes</td><td>Upon completion of the subject, students will be able to:
(a) apply analytical reasoning to solve problems in science and engineering;
(b) make use of the knowledge of mathematical/statistical techniques and adapt known solutions to various situations;
(c) apply mathematical modeling in problem solving;
(d) demonstrate abilities of logical and analytical thinking.</td></tr>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>Elementary calculus: Mean Value Theorem with applications to optimization and curve sketching. Definite and indefinite integrals, fundamental theorem of calculus, methods of integration (integration by substitution, integration by parts, integration of rational functions using partial fractions and integration of trigonometric and hyperbolic functions), reduction formulas, applications to geometry and physics. Improper Integrals.

Linear algebra: Basic properties of matrices and determinants, linear systems, Gaussian elimination, inverse of a square matrix, Cramer’s rule, vectors in 2- space or in 3-space, applications to geometry.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>Basic concepts and elementary techniques of differential and integral calculus and linear algebra will be taught in lectures. These will be further enhanced in tutorials through practical problem solving.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1.Assignments and tests</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
</table>
</td></tr>
</table>

	Total	100 %	
	Continuous Assessment comprises of assignments and tests. An examination is held at the end of the semester. Questions used in assignments, tests and examinations are used to assess students' level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering. Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: *The subject focuses on understanding of basic concepts and application of techniques in differential/integral calculus, elementary statistics and elementary linear algebra. As such, an assessment method based mainly on examinations/tests is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.*	

Student Study Effort Expected	Class contact:	
	▪ Lecture	26 Hrs.
	▪ Tutorial	13 Hrs.
	Other student study effort:	
	▪ Homework and self-study	81 Hrs.
	Total student study effort	120 Hrs.
Reading List and References	Chung, K.C. *A Short Course in Calculus and Matrices*, McGraw Hill 2013 Hung, K.F., Kwan, Wilson, Pong, T.Y. *Foundation Mathematics & Statistics*, McGraw Hill 2013 Larson, R., Edwards, B. *Single Variable Calculus*, Brooks/Cole 2012 Larson, R. *Elementary Linear Algebra*, Brooks/Cole 2013	

Subject Description Form

Subject Code	AMA2111
Subject Title	Mathematics I
Credit Value	3
Level	2
Pre-requisite	Calculus and Linear Algebra (AMA1007) or Basic Mathematics II – Calculus and Linear Algebra (AMA1120) or Calculus for Engineers (AMA1130) or Calculus (AMA1131) or Foundation Mathematics for Accounting and Finance (AMA1500)
Exclusion	Intermediate Calculus and Linear Algebra (AMA2007/ AMA2707) Mathematics for Engineers (AMA2131/AMA2308) Engineering Mathematics (AMA2380) Applied Mathematics I (AMA2511) Mathematics for Scientists and Engineers (AMA2882) Engineering Mathematics (AMA290)
Objectives	This subject aims to introduce students to the basic principles and techniques of engineering mathematics. Emphasis will be on the understanding of fundamental concepts as well as applications of mathematical methods in solving practical problems in science and engineering.
Intended Learning Outcomes	**Upon completion of the subject, students will be able to:** 1. apply mathematical reasoning to analyze essential features of different problems in science and engineering; 2. extend their knowledge of mathematical and numerical techniques and adapt known solutions in various situations; 3. develop and extrapolate the mathematical concepts in synthesizing and solving new problems 4. demonstrate abilities of logical and analytical thinking 5. search for useful information in the process of problem solving.

<table>
<tr><td>Subject Synopsis/ Indicative Syllabus</td><td>
1. Algebra of complex numbers

Complex numbers, geometric representation, complex exponential functions, n-th roots of a complex number.

2. Linear algebra

Systems of linear equations, vector spaces, inner product and orthogonality, eigenvalues and eigenvectors, applications.

3. Ordinary differential equations

ODE of first and second order, linear systems, Laplace transforms, Convolution theorem, applications to mechanical vibrations and simple circuits.

4. Differential calculus of functions of several variables

Partial derivatives, total differential, chain rule, Taylor’s expansion, maxima and minima, directional derivatives, Lagrange multipliers, implicit differentiation, applications.
</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The subject will be delivered mainly through lectures and tutorials. The lectures aim to provide the students with an integrated knowledge required for the understanding and application of mathematical concepts and techniques. Tutorials will mainly be used to develop students’ problem solving ability.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr>
<tr><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr>
<tr><td>1.Homework, quizzes and mid-term test</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100%</td><td></td><td></td><td></td><td></td><td></td></tr>
</table>
Continuous Assessment comprises of assignments, in-class quizzes, online quizzes and a mid-term test. An examination is held at the end of the semester.

Questions used in assignments, quizzes, tests and examinations are used to assess
</td></tr>
</table>

<table>
<tr><td></td><td colspan="2">students' level of understanding of the basic concepts and their ability to use mathematical techniques in solving problems in science and engineering.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The subject focuses on understanding of basic concepts and application of techniques in engineering mathematics. As such, an assessment method based mainly on examinations/tests/quizzes is considered appropriate. Furthermore, students are required to submit homework assignments regularly in order to allow subject lecturers to keep track of students' progress in the course.</td></tr>
<tr><td rowspan="7">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>• Lecture</td><td>26 Hours</td></tr>
<tr><td>• Tutorial</td><td>13 Hours</td></tr>
<tr><td>• Mid-term test and examination</td><td></td></tr>
<tr><td>Other student study effort</td><td></td></tr>
<tr><td>• Assignments and Self study</td><td>78 Hours</td></tr>
<tr><td>Total student study effort:</td><td>117 Hours</td></tr>
<tr><td>Reading List and References</td><td colspan="2">1. C.K. Chan, C.W. Chan and K.F. Hung, Basic Engineering Mathematics, McGraw-Hill, 2015.

2. Anton, H. Elementary Linear Algebra (11th edition). Wiley, 2014.

3. Kreyszig, E. (2011). Advanced Engineering Mathematics, 10th ed. Wiley.

4. James, G. (2015). Modern Engineering Mathematics, 5th ed. Pearson Education Limited

5. Thomas, G. B., Weir, M. D. & Hass, J. R. Thomas' Calculus, 14th ed. Pearson Education 2017</td></tr>
</table>

Subjects offered by
Department of Applied Physics

Subject Description Form

Subject Code	AP10005
Subject Title	Physics I
Credit Value	3
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This course provides a broad foundation in mechanics and thermal physics to those students who are going to study science, engineering, or related programmes.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) solve simple problems in single-particle mechanics using calculus and vectors; (b) solve problems in mechanics of many-particle systems using calculus and vectors; (c) understand simple harmonic motion and solve simple problems; (d) solve problems related to acoustic standing waves; (e) calculate changes in frequency received due to Doppler's effect; (f) apply ideal gas laws to solve problems; (g) apply the first law of thermodynamics to simple processes; and (h) solve simple problems related to the cyclic processes.
Subject Synopsis/ Indicative Syllabus	**Mechanics**: calculus-based kinematics, dynamics and Newton's laws; calculus-based Newtonian mechanics, involving the application of impulse, momentum, work and energy, etc.; conservation law; gravitational force; systems of particles; collisions; rigid body rotation; angular momentum; oscillations and simple harmonic motion; pendulum; statics; longitudinal and transverse waves; travelling wave and standing wave; Doppler effect; sound waves and beats. **Thermal physics**: conduction, convection and radiation; black body radiation; ideal gas and kinetic theory; work, heat and internal energy; first law of thermodynamics; entropy and the second law of thermodynamics; Carnot cycle; heat engine and refrigerators.
Teaching/Learning	**Lecture**: Fundamentals in mechanics, waves and electromagnetism will be

<table>
<tr><td>Methodology</td><td>explained. Examples will be used to illustrate the concepts and ideas in the lecture. Students are free to request help. Homework problem sets will be given.

Student-centered Tutorial: Students will work on a set of problems in tutorials. Students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. These problem sets provide them opportunities to apply their knowledge gained from the lecture. They also help the students to consolidate what they have learned. Furthermore, students can develop a deeper understanding of the subject in relation to daily life phenomena or experience.

e-learning: In order to enhance the effectiveness of teaching and learning processes, electronic means and multimedia technologies would be adopted for presentations of lectures; communication between students and lecturer; delivery of handouts, homework and notices etc.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="8">Intended subject learning outcomes to be assessed
(Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g</td><td>h</td></tr>
<tr><td>(1) Continuous assessment</td><td>40</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>(2) Examination</td><td>60</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100</td><td colspan="8"></td></tr>
</table>

Continuous assessment:
The continuous assessment includes assignments, quizzes and test(s) which aim at checking the progress of students' study throughout the course, assisting them in fulfilling the learning outcomes.
Assignments in general include end-of-chapter problems, which are used to reinforce and assess the concepts and skills acquired by the students; and to let them know the level of understanding that they are expected to reach.
At least one test would be administered during the course of the subject as a means of timely checking of learning progress by referring to the intended outcomes, and as means of checking how effective the students digest and consolidate the materials taught in the class.

Examination: This is a major assessment component of the subject. It would be a closed-book examination. Complicated formulas would be given to avoid rote memory, such that the emphasis of assessment would be put on testing the understanding, analysis and problem solving ability of the students.</td></tr>
</table>

Student Study Effort Expected	Class contact:	
	• Lecture	33 h
	• Tutorial	6 h
	Other student study effort:	
	• Self-study	81 h
	Total student study effort:	120 h
Reading List and References	John W. Jewett and Raymond A. Serway, “Physics for Scientists and Engineers”, 2014, 9th edition, Brooks/Cole Cengage Learning. Hafez A. Radi, John O. Rasmussen, “Principles of physics: for scientists and engineers”, 2013, Springer. W. Bauer and G.D. Westfall, “University Physics with Modern Physics”, 2011, McGraw-Hill.	

Subject Description Form

Subject Code	AP10006
Subject Title	Physics II
Credit Value	3
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	To provide students with fundamental knowledge in physics focusing on the topics of waves and electromagnetism. This course prepares students to study science, engineering or related programmes.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: (a) apply simple laws in optics to explain image formation; (b) understand phenomena related to the wave character of light; (c) solve problems in electrostatics; (d) solve problems on interaction between current and magnetic field; (e) apply electromagnetic induction to various phenomena; and (f) solve problems in simple circuits.
Subject Synopsis/ Indicative Syllabus	**Waves and optics**: nature of light, reflection and refraction; Snell's law; image formation by mirrors and lenses; compound lens; microscope and telescope; superposition of waves; Huygen's principle; interference and diffraction; diffraction grating; Rayleigh's criterion and optical resolution; polarization. **Electromagnetism**: charge and Field; Coulomb's law and Gauss' law; electrostatic field and potential difference; capacitors and dielectric; current and resistance; Ohm's law; electromotive force, potential difference; Lorentz force; magnetic force on moving charges and current; Hall effect; Biot-Savart law and Ampere's law; Faraday's law and Lenz's law; induction; transformers; AC circuits and applications.
Teaching/Learning Methodology	**Lecture**: The fundamentals in optics and electromagnetism will be explained. Examples will be used to illustrate the concepts and ideas in the lecture. Students are free to request help. Homework problem sets will be given.

<table>
<tr><td></td><td>

Student-centered Tutorial: Students will work on a set of problems in tutorials. Students are encouraged to solve problems and to use their own knowledge to verify their solutions before seeking assistance. These problem sets provide them opportunities to apply their knowledge gained from the lecture. They also help the students to consolidate what they have learned. Furthermore, students can develop a deeper understanding of the subject in relation to daily life phenomena or experience.

e-learning: In order to enhance the effectiveness of teaching and learning processes, electronic means and multimedia technologies would be adopted for presentations of lectures; communication between students and lecturer; delivery of handouts, homework and notices etc.

</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="7">Intended subject learning outcomes to be assessed
(Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td>e</td><td>f</td><td></td></tr>
<tr><td>(1) Continuous assessment</td><td>40</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>(2) Examination</td><td>60</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Total</td><td>100</td><td colspan="7"></td></tr>
</table>

Continuous assessment:
The continuous assessment includes assignments, quizzes and test(s) which aim at checking the progress of students' study throughout the course, assisting them in fulfilling the learning outcomes.
Assignments in general include end-of-chapter problems, which are used to reinforce and assess the concepts and skills acquired by the students; and to let them know the level of understanding that they are expected to reach.
At least one test would be administered during the course of the subject as a means of timely checking of learning progress by referring to the intended outcomes, and as means of checking how effective the students digest and consolidate the materials taught in the class.

Examination: This is a major assessment component of the subject. It would be a closed-book examination. Complicated formulas would be given to avoid rote memory, such that the emphasis of assessment would be put on testing the understanding, analysis and problem solving ability of the students.

</td></tr>
<tr><td>Student Study</td><td>Class contact:</td><td></td></tr>
</table>

Effort Expected	• Lecture	33 h
	• Tutorial	6 h
	Other student study effort:	
	• Self-study	81 h
	Total student study effort	120 h
Reading List and References	John W. Jewett and Raymond A. Serway, “Physics for Scientists and Engineers”, 2014, 9th edition, Brooks/Cole Cengage Learning. Hafez A. Radi, John O. Rasmussen, “Principles of physics: for scientists and engineers”, 2013, Springer. W. Bauer and G.D. Westfall, “University Physics with Modern Physics”, 2011, McGraw-Hill.	

Subject offered by
Department of Applied Social Science

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	APSS1L01
Subject Title	Tomorrow's Leaders
Credit Value	3
Level	1
GUR Requirements Intended to Fulfill	This subject intends to fulfill the following requirement(s): ☐ **Healthy Lifestyle** ☐ **AI and Data Analytics (AIDA)** ☐ **Innovation and Entrepreneurship (IE)** ☐ **Languages and Communication Requirement (LCR)** ☒ **Leadership Education and Development (LEAD)** ☐ **Service-Learning** ☐ **Cluster-Area Requirement (CAR)** ☐ Human Nature, Relations and Development [CAR A] ☐ Science, Technology and Environment [CAR D] ☐ Chinese History and Culture [CAR M] ☐ Cultures, Organizations, Societies and Globalization [CAR N] ☐ **China-Study Requirement** ☐ Yes or ☐ No ☐ **Writing and Reading Requirements** ☐ English or ☐ Chinese
Pre-requisite / Co-requisite/ Exclusion	Nil
Assessment Methods	

100% Continuous Assessment	Individual Assessment	Group Assessment
1. Class Participation (including 5% "Learning to learn" self-reflection)	20%	--
2. Group Project	--	30%
3. Term Paper	50%	--
4. Online Academic Integrity Tutorial Test	Compulsory Pass Requirement	
5. Law Abiding-Leadership Test	Compulsory Pass Requirement	

	• The grade is calculated according to the percentage assigned; • The completion and submission of all component assignments are required for passing the subject; and • Student must pass all component(s) if he/she is to pass the subject.
Objectives	The course is designed to enable students to learn and integrate theories, research and concepts of the basic personal qualities (particularly intrapersonal and interpersonal qualities) of effective leaders. This subject also intends to help students develop and reflect on their intrapersonal qualities, interpersonal qualities and connection of learning to oneself. Finally, the subject cultivates students' appreciation of the importance of intrapersonal and interpersonal qualities in effective leadership.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: a. understand and integrate theories, research and concepts on the basic qualities (particularly intrapersonal and interpersonal qualities) of effective leaders; b. develop self-awareness and self-understanding; c. demonstrate self-leadership in pursuit of continual self-improvement; d. apply intrapersonal and interpersonal skills in daily lives; e. appreciate the importance of intrapersonal and interpersonal qualities in effective leadership, particularly the connection of learning in the subject to one's professional development and personal growth; f. recognize and accept their responsibility as professionals and citizens to the society and the world.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	1. An overview of the personal attributes of effective leaders: roles of intrapersonal and interpersonal qualities in effective leadership and university graduates' employability in the service economy; **compulsory requirements of the subject**: "Learning to learn" assessment; Online Tutorial on Academic Integrity; law abiding-leadership assessment; group presentation; individual assignment; class participation. 2. Self-leadership in effective leaders: the importance of self-understanding and self-management; "Learning to learn" ability; life-long learning and leadership. 3. Cognitive competence (critical thinking): misinformation, disinformation, and propaganda; different types of thinking styles; critical thinking model; roles of cognitive competence, critical thinking and problem solving in effective leadership; learning to learn. 4. Social emotional competence: social awareness; relationship management; the application of social emotional competence in daily lives and in effective leadership. 5. Resilience and stress-coping: concepts and theories of resilience and stress-coping; relationship between resilience, stress and stress-coping; role of resilience in effective leadership; application of resilience and stress-coping on daily basis. 6. Morality and integrity: moral competence; role of morality in effective leadership; ethical leadership; importance of moral competence in different professions, academic integrity in university students (online tutorial on academic integrity). 7. Spirituality: connectedness to others, personal beliefs and values, meaning of life, spirituality and professional development, role of spirituality in effective leadership; spiritual practices in daily lives.

8. Law-abidance as a quality of leadership: basic concepts and theories related to law-abiding leadership and socially responsible leadership; importance of law-abiding leadership and socially responsible leadership to professionals and the general public; basic knowledge on national security and the Hong Kong; Hong Kong National Security Law; a brief overview of modern Chinese history, the Constitution, and the Basic Law.
9. Cultural competence and global citizenship: cultual competence in a globalized world; global citizenship and effective leadership; responsibilites of university students as both professionals and citizens of the society.
10. Effective communication: basic communication skills; importance of effective communication to daily life and leadership; care and compassion in effective leadership.
11. Team building: theories, concepts, skills and blocks of team building; role of team building in effective leadership; application of team building in different professions and daily lives.

Note: For the topic on law abidance and the Hong Kong National Security Law, students are required to pass an online assessment with multiple-choice questions. Students can take the assessment with multiple attempts. The assessment does not carry any mark.

Teaching/Learning Methodology

(Note 3)

Students taking this course are expected to be sensitive to their own behavior in intrapersonal and interpersonal contexts. Intellectual thinking, reflective learning, experiential learning and collaborative learning are emphasized in the course. Case studies on successful and fallen leaders will also be covered in the course. The teaching/learning methodology includes:

1. Lectures (including e-learning modules);
2. Experiential classroom activities;
3. Group project presentation;
4. Written assignment.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
1. Class Participation (including 5% "Learning to learn" self-reflection) ^	20%	✓	✓	✓	✓	✓	✓
2. Group Project*	30%	✓	✓	✓	✓	✓	✓
3. Term Paper^	50%	✓	✓	✓		✓	
4. Academic integrity online module and assessment^	0%	✓			✓	✓	
5. Quiz on law abidance and Hong	0%	✓	✓	✓	✓	✓	✓

Kong National Security Law^							
Total	100 %						

*assessment is based on group effort
^assessment is based on individual effort

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

1. Assessment of Class Participation (20%): It is expected that both online and classroom activities, and preparation for lectures can help students understand the subject matter and oneself, develop social skills, connect learning to oneself and promote an appreciation of the importance of intrapersonal and interpersonal leadership qualities. Hence, marks for class participation (including the participation in e-learning modules) and preparation for lectures will be given. Students will be assessed by: a) preparation for class (e.g., complete e-learning modules, online assignment, and dig up materials before class), b) participation in class and online learning activities (e.g., completion of worksheets and sharing in class, participation in online discussion forum) and c) volunteering to answer questions and join discussions. Also, students will be invited to rate the performance and learning of other group members in an honest and authentic manner. The marks will reflect the mastery of knowledge, self-reflection and quality of interpersonal skills (such as collaboration with other members and contribution to the group) of the group members. Peer assessment will contribute to marks in class participation.

   As the university strategic priority, "Learning to learn" has the aim to support the development of students' ability to engage in the learning process, manage their own learning, and take their learning to a higher level. "Learning to learn" concept will be covered in the lectures and students are required to develop a personal development plan at the beginning of the course. To encourage students to reflect on their experience in achieving their learning goals set in the development plan, students are required to reflect on their learning to learn ability and related learning experience in a reflective journal (5%).

2. Assessment of Group Project (30%): Group project presentation can give an indication of the students' understanding and integration of theories and concepts on the personal qualities in effective leadership, personal and group reflections, interpersonal skills and degree of recognition of the importance of active pursuit of knowledge covered in the course.

3. Assessment of Term Paper (50%): Individual paper can give an indication of the students' understanding and integration of theories and concepts on the personal qualities in effective leadership, self-assessment, self-reflection, connection of the subject matter to oneself and degree of recognition of the importance of active pursuit of knowledge covered in the course.

4. Quiz on Law Abidance and Hong Kong National Security Law (0%): As universities have the obligation to conduct education on the Constitution, Basic Law and Hong Kong National Security Law, students are required to take a 3-hour face-to-face lecture on law abiding leadership and 7 hours of self-study. Based on the related materials on modern Chinese history, the Constitution, the Basic Law, restoration of Hong Kong to mainland China, national security and the Hong Kong National Security

Law, students have to take an assessment with 20 multiple choice questions. Students can pass the assessment if he/she has correct answers on at least 16 questions (multiple attempts allowed). A student will fail in this subject if he/she cannot pass this assessment component.

5. Academic Integrity Online Module and Assessment (0%): As academic integrity is very important for university students, students are required to take an online Academic Integrity program lasting for two hours. First, students are required to take a multiple-choice test with 10 questions in the pre-test without a passing mark (multiple attempts allowed). After that, students need to study four online modules to understand the concepts of academic integrity and ways to avoid academic dishonesty. Finally, students are required to take another multiple-choice test with 20 questions in the post-test with a passing benchmark of 15 questions (multiple attempts allowed). A student will fail in this subject if he/she cannot pass this assessment component. They must complete this component by the 5th week of the semester.

Based on the implementation of this subject in the past ten academic years (2012-2022), evaluation findings consistently showed that this subject was able to achieve the intended learning outcomes in the students. The positive evaluation findings are documented as follows:

Leung, H. (2016). Levels of reflection on teaching a leadership and positive youth development subject. *International Journal on Disability and* Human *Development, 15*(2)*,* 211-220.

Leung, H., Shek, D. T. L., & Mok, B. P. W. (2016). Post-lecture subjective outcome evaluation of a university subject on leadership and intrapersonal development. *International Journal of Child and Adolescence Health, 9*(2)*,* 223-234.

Li, X., & Shek, D. T. L. (2020). Objective outcome evaluation of a leadership course utilising the positive youth development approach in Hong Kong. *Assessment & Evaluation in Higher Education, 45*(5), 741-757.

Ma, C. M. S., Shek, D. T. L., & Li, P. P. K. (2017). Evaluation of a leadership and intrapersonal development subject for university students: Experience in Hong Kong. *International Journal of Child and Adolescent Health, 10*(3), 337-346.

Ma, C. M. S., Shek, D. T. L., Li, P. P. K., Mok, B. P. W. & Leung, E. Y. K. (2016). Qualitative evaluation of a leadership and intrapersonal development subject for university students in Hong Kong. *International Journal of Child and Adolescent Health, 9*(2), 217-224.

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Shek, D. T. L., Fok, H. K., Leung, C. T. L., & Li, P. P. K. (2016). Qualitative evaluation of a credit-bearing leadership subject in Hong Kong. *International Journal of Child and Adolescent Health, 9*(2), 173-183.

Shek, D. T. L., & Leung, J. T. Y. (2014) Perceived benefits of a university subject on leadership and intrapersonal development. *International Journal on Disability and Human Development. 13*(4), 481-488.

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<table>
<tr><td></td><td colspan="2">*13*(4), 451-456.
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Shek, D. T. L., & Yu, L. (2014). Post-course subjective outcome evaluation of a subject on leadership and intrapersonal development for university students in Hong Kong. *International Journal on Disability and Human Development, 13*(4), 457-464.
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Shek, D. T. L., & Yu, L. (2017). An evaluation study on a university general education subject in Hong Kong. *International Journal of Adolescent Medicine and Health, 29*(1),103-109.
Shek, D. T. L., Yu, L., Lin, L., Li, X., Zhu, X., Dou, D., Chai, W., Chak, Y., Ho, W., Leung, E., Li, P., Mok, B., Shek, V., Shek, E., & Jin, T. (2021). Nurturing leadership qualities under COVID-19: Student perceptions of the qualities and effectiveness of online teaching and learning on leadership development. *International Journal of Child and Adolescent Health, 14*(1), 89-100.
Shek, D. T. L., Zhu, X., Li, X., & Dou, D. (2022). Satisfaction with HyFlex teaching and law-abiding leadership education in Hong Kong university students under COVID-19. *Applied Research in Quality of Life,* 1-26.
Yu. L., Shek, D. T. L., & Leung, E. Y. K. (2016). Post-lecture evaluation of a university subject on leadership and intrapersonal development. *International Journal of Child and Adolescent Health, 9*(2)*,* 155-164.</td></tr>
<tr><td rowspan="6">Student Study Effort Expected</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures and experiential/online learning activities</td><td>39 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Group project preparation</td><td>20 Hrs.</td></tr>
<tr><td>▪ Reading and writing term paper</td><td>61 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>120 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">Basic References
Catalano, R. F., Berglund, M. L., Ryan, J. A. M., Lonczak, H. S., & Hawkins, J. D. (2002). Positive youth development in the United States: Research findings on evaluations of positive youth development programs. *Prevention and Treatment, 5*(15), 1-106.
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</table>

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Lau, P. S. Y., & Wu, F. K. Y. (2012). Emotional competence as a positive youth development construct: A conceptual review. *The Scientific World Journal, 2012*, 8 pages. doi:10.1100/2012/975189
Marsh, H. W. (1990). A multidimensional, hierarchical self-concept: Theoretical and empirical justification. *Educational Psychological Review, 2*(2), 77-172.
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Rockstuhl, T., Seiler, S., Ang, S., Van Dyne, L., & Annen, H. (2011). Beyond general intelligence (IQ) and emotional intelligence (EQ): The role of cultural intelligence (CQ) on cross-border leadership effectiveness in a globalized world. *Journal of Social Issues, 67*(4), 825-840.
Rycek, R. F., Stuhr, S. L., McDermott, J., Benker, J., & Swartz, M. D. (1998). Adolescent egocentrism and cognitive functioning during late adolescence. *Adolescence, 33*(132), 745-749.
Seligman, M. E. P., & Csikszentmihalyi, M. (2000). Positive psychology: An introduction. *American Psychologist, 55*(1), 5-14.
Shek, D. T. L. (2010). Nurturing holistic development of university students in Hong Kong: Where are we and where should we go? *The Scientific World Journal, 10*, 563-575.
Shek, D. T. L. (2012). Spirituality as a positive youth development construct: A conceptual review. *The Scientific World Journal*, *2012*, 8 pages. doi:10.1100/2012/458953
Shek, D. T. L., & Leung, H. (2016a). Developing self-leadership and responsibility and moving away from egocentrism. *International Journal on Disability and Human Development, 15*(2), 157-164.

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Govier, I. (2000). Spiritual care in nursing: A systematic approach. *Nursing Standard, 14*(17), 32-36.

Kumru, A., & Thompson, R. A. (2003). Ego identity status and self-monitoring behavior in adolescents. *Journal of Adolescent*

	Research, 18(5), 481-495. Leung, J. T. Y., & Shek, D. T. L. (2020). Theories of adolescent development: Overview. In D. T. L. Shek, & J. T. Y. Leung (Eds.), The encyclopedia of child and adolescent development. (Volume 7: History, theory, and culture in adolescence). (pp. 2887-2897). New York, NY: Wiley. Luthans, F., Vogelgesang, G. R., & Lester, P. B. (2006). Developing the psychological capital of resiliency. *Human Resource Development Review, 5*(1), 25-44. Neck, C. P., & Houghton, J. D. (2006). Two decades of self-leadership theory and research: Past developments, present trends, and future possibilities. *Journal of Managerial Psychology*, *21*(4), 270-295. Shek, D. T. L. (Ed.) (2019). Mental health and well-being of adolescents in Hong Kong [Special issue]. *Journal of Adolescent Health, 64*(6), S1-S86. Shek, D. T. L., Yu, L., & Merrick, J. (Eds.) (2019). Promotion of holistic development of university students in Hong Kong. [Special issue]. *International Journal of Child and Adolescent Health, 12*(1), 1-122. Rose-Krasnor, L. (1997). The nature of social competence: A theoretical review. *Social Development*, *6*(1), 111-135.

Note 1: Intended Learning Outcomes

Intended learning outcomes should state what students should be able to do or attain upon completion of the subject. Subject outcome are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/ Indicative Syllabus

The syllabus should adequately address the intended learning outcomes. At the same time over-crowding of the syllabus should b avoided.

Note 3: Teaching/Learning Methodology

This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justificatio of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method

This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intende learning outcomes that each method purports to assess. It should also provide a brief explanation of the appropriateness of the assessmer methods in assessing the intended learning outcomes.

Subjects offered by
Chinese Language Centre

Subject Description Form

Subject Code	CLC1104C (Cantonese) / CLC1104P (Putonghua) [2019-20 onward] CBS1104C (Cantonese) / CBS1104P (Putonghua) [2018-19 and before] ***Remarks: Students taking the Cantonese version of CLC/CBS1104 (i.e. CLC/CBS1104C) will be offered a 39 hour non-credit bearing e-learning course in Putonghua (optional).***
Subject Title	University Chinese（大學中文）
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Students with HKDSE Chinese subject result at level 3 or above or equivalent
Objectives	This subject aims at enhancing the students' command of language knowledge to communicate effectively in both written and spoken Chinese, with particular reference to the stylistic variations of expression in different communicative settings. The ultimate goal of this subject is to train students to be effective communicators and life-long learners, and to equip them for the Chinese Discipline-Specific Language Requirement subject.
Intended Learning Outcomes *(Note 1)*	Upon completion of the subject, students will be able to: (a) consolidate the ability to identify and correct the most common errors in written texts; (b) develop Chinese writing skills through the analysis and in-depth reading of selected literary masterpieces; (c) master the format, organization, language and style of expression of various genres of Chinese writing; (d) produce formal presentations in spoken Chinese effectively and appropriately.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	1. Written communication Language, format and organization of each genre; coherence and thread of thinking in Chinese writing; style of expression of different genres; context dependent stylistic variation; development of logical and persuasive arguments. 2. Spoken communication Choice of words; articulation and flow of speaking; manner of speaking and gesture; identification of main idea and key messages; evaluation of relevancy of information in a message; skills of summarizing; agreeing / disagreeing /answering to questions politely; use of visual aids; body movement.

<table>
<tr><td></td><td>3. Reading strategies

Intensive and critical reading; identification of authors' stances, arguments and purposes; extracting useful information from the texts; determination of the meanings of the important concept words in context; evaluation of the validity of the factual information and arguments of the texts; appreciation of different genres including literary masterpieces.

4. Language development

Grammatical skills; use of clear words; use of specific sentences; choice of diction.</td></tr>
<tr><td>Teaching/Learning Methodology

(Note 3)</td><td>The teaching/learning methodology is a combination of highly interactive seminars, self-formed study groups, seminar discussion, oral presentations and written assignments. E-learning materials for enhancing students' proficiency in both spoken and written Chinese are included in Chinese LCR teaching.

Students are expected to follow teachers' guidelines and get access to the materials on the e-Learning platform for self-study on a voluntary basis.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>Quizzes / Exercises</td><td>20%</td><td>√</td><td></td><td>√</td><td></td></tr>
<tr><td>Written Assignments</td><td>55%</td><td>√</td><td>√</td><td>√</td><td></td></tr>
<tr><td>Oral presentation</td><td>25%</td><td>√</td><td></td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The quizzes and exercises are designed to assess students' basic knowledge of Chinese linguistics and how well they achieve ILOs (a) and (c). The writing assessments aim to obtain an objective measurement of students' basic competence in the use of written Chinese in accurate and appropriate grammatical structures (ref. ILOs (a), (b) and (c)). The oral assessment assesses students' ability to plan and present accurately, appropriately and effectively (ref. ILOs (a), (c) and (d)). Explanations and exercises are provided in classroom teaching.</td></tr>
</table>

Student Study Effort Expected	Class contact:	
	▪ Seminar	39 Hrs.
	Additional activity:	
	▪ e-Learning in Putonghua and written Chinese	9 Hrs.
	Other student study effort:	
	▪ Outside Class Practice	39 Hrs.
	▪ Self-study	39 Hrs.
	Total student study effort	126 Hrs.

Reading List and References	1. 于成鯤、陳瑞端、秦扶一、金振邦主編：《當代應用文寫作規範叢書》，上海：復旦大學出版社，2011年。 2. 任伯江：《口語傳意權能：人際關係策略與潛力》，香港：香港中文大學出版社，2006年。 3. 吳禮權：《演講的技巧》，香港：商務印書館，2013年。 4. 李錦昌：《商業溝通與應用文大全》，香港：商務印書館，2012年。 5. 邵敬敏：《現代漢語通論》，上海：上海教育出版社，2007年。 6. 香港城市大學語文學部編著：《中文傳意一基礎篇》。香港：香港城市大學出版社，2001。 7. 香港城市大學語文學部編著：《中文傳意一寫作篇》。香港：香港城市大學出版社，2001。 8. 孫光萱：《中國現代散文名家名篇賞讀》，上海：上海教育出版社，2001年。 9. 梁慧敏：《正識中文》，香港：三聯書店，2010年。 10. 梁慧敏：《語文正解》，香港：三聯書店，2015年。 11. 梁慧敏：《語文通病》，香港：三聯書店，2014年。 12. 陳瑞端，《生活病語》，香港：中華書局，2000。 13. 陳瑞端：《生活錯別字》，香港：中華書局，2000年。 14. 賴蘭香：《傳媒中文寫作》(新修本)，香港：中華書局，2012年。

Subject Description Form

Subject Code	CLC3241P (2019-20 onward) CBS3241P (2018-19 and before)
Subject Title	Professional Communication in Chinese
Credit Value	2
Level	3
Pre-requisite / Co-requisite	Chinese LCR subjects (in Semester 2 of Year 3 or Semester 1 of Year 4)
Objectives	This subject aims to develop the language competence for professional communication in Chinese required by students to communicate effectively with various parties and stakeholders in regard to engineering-related project proposals and reports.
Intended Learning Outcomes	Upon completion of the subject, and in relation to effective communication with a variety of intended readers/audiences in Chinese, students will be able to a. plan, organise and produce professionally acceptable project proposals and reports with appropriate text structures and language for different intended readers b. plan, organise and deliver effective project-related oral presentations with appropriate interactive strategies and language for different intended audiences c. adjust the style of expression and interactive strategies in writing and speaking in accordance with different intended readers/audiences
Subject Synopsis/ Indicative Syllabus	1. Project proposals and reports in Chinese • Planning and organising project proposals and reports • Explaining the background, rationale, objectives, scope and significance of a project • Referring to the literature to substantiate project proposals • Describing the methods of study • Describing and discussing project results, including anticipated results and results of pilot study

<table>
<tr><td></td><td>

- Presenting the budget, schedule and/or method of evaluation
- Writing executive summaries./abstracts

2. Oral presentations of projects
- Selecting content for audience-focused presentations
- Choosing language and style appropriate to the intended audience
- Using appropriate transitions and maintaining coherence in team presentations
- Using effective verbal and non-verbal interactive strategies

</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>

<u>Learning and teaching approach</u>

The subject is designed to develop the students' Chinese language skills, both oral and written, that students need to communicate effectively and professionally with a variety of stakeholders of engineering-related projects. It builds upon the language and communication skills covered in GUR language training subjects.

The study approach is primarily seminar-based. Seminar activities include instructor input as well as individual and group work, involving drafting and evaluating texts, mini-presentations, discussions and simulations.

The learning and teaching activities in the subject will focus on a course-long project which will engage students in proposing and reporting on an engineering-related project to different intended readers/audiences. During the course, students will be involved in:

- planning and researching the project
- writing project-related documents such as project proposals and reports
- giving oral presentations to intended stakeholders of the project

</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td></td><td></td><td></td></tr>
<tr><td>1. Project proposal in Chinese</td><td>60%</td><td>✓</td><td></td><td>✓</td><td></td><td></td><td></td></tr>
<tr><td>2. Oral presentation of project proposal</td><td>40%</td><td></td><td>✓</td><td>✓</td><td></td><td></td><td></td></tr>
</table>

</td></tr>
</table>

	Total	100 %	
	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The assessments will arise from the course-long engineering-related project. • Students will be assessed on written documents and oral presentations targeted at different intended readers/audiences. This facilitates assessment of students' ability to select content and use language and style appropriate to the purposes and intended readers/audiences. • Students will collaborate in groups in planning, researching, discussing and giving oral presentations on the project. The written proposals will be individual work to ensure that students will be rigorously engaged in the application of language skills for the entire document.		

Student Study Effort Expected	Class contact:	
	▪ Seminars	26 Hrs.
	Other student study effort:	
	▪ Researching, planning, writing, and preparing the project	44 Hrs.
	Total student study effort	70 Hrs.

Reading List and References

a) 司有和 (1984) ：《科技寫作簡明教程》，安徽教育出版社。

b) 葉聖陶、呂叔湘、 朱德熙、 林燾 (1992)：《文章講評》 語文出版社。

c) 于成鯤主編（2003）：《現代應用文》，復旦大學出版社。

d) 岑紹基、謝錫金、祈永華 (2006) ：《應用文的語言·語境·語用》，香港教育圖書公司。

e) 邵敬敏主編 (2010) ：《現代漢語通論 (第二版)》，上海教育出版社。

f) 于成鯤、陳瑞端、秦扶一、金振邦主編 (2010)：《中國現代應用文寫作規範叢書：科教文與社交文書寫作規範》，復旦大學出版社。

g) 香港特別行政區政府教育局·課程發展處中國語文教育組 (2012) ：《常用字字形表》，政府物流服務署印。

Subject offered by
Department of Electrical and Electronic Engineering

Subject Description Form

Subject Code	EIE2302
Subject Title	Electricity and Electronics
Credit Value	3
Level	2
Pre-requisite	Nil
Co-requisite/ Exclusion	Nil
Objectives	1. Introduce the fundamental concepts of operation of electric circuits applicable to engineering students. 2. Develop ability for solving problems involving electric circuits. 3. Understand the function and application of basic electronic devices. 4. Develop skills for experimentation on electric circuits. 5. Impart relevant skills and knowledge in basic electricity and electronics for independent learning of other subjects that require such skills and knowledge.
Intended Learning Outcomes	**Upon completion of the subject, students will be able to:** Category A: Professional/academic knowledge and skills 1. Understand the operating principles of some fundamental electric circuits. 2. Solve simple problems in electric circuits. 3. Use suitable instrumentation to carry out experimental investigations to validate the theoretical investigations. 4. Understand the basic function and application of some basic electronic devices.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. DC circuits - Introduction to electric circuits. Potential and potential difference. Current. Resistance. Ohm's law. Kirchhoff laws. Voltage divider, current divider, series and parallel circuits. Node Voltage and Mesh Current Analyses. Thévenin and Norton Equivalents, Wheatstone bridge. Power dissipation and maximum power transfer. 2. Basic AC elements and simple AC circuits. 3. Electrical machines and protection - Generators. Motors. Mutual inductance and transformer. Circuit breakers. Motor selection. 4. Basic electronic devices - Junction diodes, bipolar junction transistors, field-effect transistors and their applications in simple mechatronics. 5. Applications of electronic devices – Solid state relays. ADC. Display drivers. Motor controllers, Power supplies. Frequency converters.

Laboratory Experiments:

1. Introduction to laboratory instrumentation / Thévenin and Norton theorems
2. Voltage regulators
3. Transformer tests and characteristics.

Teaching/ Learning Methodology

Teaching and Learning Method	Intended Subject Learning Outcome	Remarks
Lectures, supplemented with interactive questions and answers	1, 2, 4	In lectures, students are introduced to the *knowledge* of the subject, and *comprehension* is strengthened with interactive Q&A.
Tutorials, where problems are discussed and are given to students for them to solve	1, 2, 4	In tutorials, students *apply* what they have learnt in solving the problems given by the tutor.
Laboratory sessions, where students will perform experimental verifications. They will have to record results and write a report on one of the experiments.	2, 3, 4	Students *acquire* hands- on experience in using electronic equipment and *apply* what they have learnt in lectures/tutorials to experimentally validate the theoretical investigations.
Assignments	1, 2, 3, 4	Through working assignments, students will develop a firm understanding and *comprehension* of the *knowledge* taught.

Alignment of Assessment and Intended Learning Outcomes

Specific Assessment Methods/ Task	% Weighting	Intended Subject Learning Outcomes to be Assessed (Please tick as appropriate)			
		1	2	3	4
1. Continuous Assessment (Total 40%)					
• Assignments	10%	✓	✓		✓
• Laboratory works and reports	10%		✓	✓	✓
• Mid-semester test	10%	✓	✓		✓
• End-of-semester test	10%	✓	✓		✓
2. Examination	60%	✓	✓		✓
Total	100%				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Specific Assessment Methods/Tasks	Remark
Assignments	Assignments are given to students to assess their competence level of *knowledge* and *comprehension*. The criteria (i.e. *what* to be demonstrated) and level (i.e. the *extent*) of achievement will be graded according to six levels: (A+ and A), Good (B+ and B), Satisfactory (C+ and C), Marginal (D) and Failure (F). These will be made known to the students before an assignment is given. Feedback about their performance will be given promptly to students to help them improvement their learning.
Laboratory works and reports	Students will be required to perform three experiments and submit a report on one of the experiments. Expectation and grading criteria will be given as in the case of assignment.
Mid-semester test	There will be a mid-semester test to evaluate students' achievement of all the learning outcomes and give feedback to them for prompt improvement. Expectation and grading criteria will be given as in the case of assignments.
End-of-semester test and Examination	There will be an end-of-semester test and examination to assess students' achievement of all the learning outcomes. These are mainly summative in nature. Expectation and grading criteria will be given as in the case of assignments.

Student Study Effort Expected		
	Class contact (time-tabled):	
	▪ Lecture	26 Hours
	▪ Tutorial	4 Hours
	▪ Laboratory	9 Hours
	Other student study effort:	
	▪ Revision	36 Hours
	▪ Tutorial and Assignments	21 Hours
	▪ Log book and Report Writing	9 Hours
	Total student study effort:	**105 Hours**

Reading List and References	**Textbooks:** 1. G. Rizzoni, *Fundamentals of Electrical Engineering*, 1st ed., McGraw-Hill, 2009. 2. A.S. Sedra and K.C. Smith, *Microelectronic Circuits*, 6th ed., Oxford University Press, 2009. **References:** 1. R.L. Boylestad and L. Nashelsky, *Electronic Devices and Circuit Theory*, 10th ed., Prentice Hall, 2008. 2. R.C. Jaeger and T.N. Blalock, *Microelectronic Circuit Design*, 4th ed., McGraw Hill, 2010. 3. C.K. Tse, *Linear Circuit Analysis,* London: Addison-Wesley, 1998. 4. D.A. Neamen, *Microelectronics: Circuit Analysis and Design*, 4th ed., McGraw Hill, 2009. 5. R.A. DeCarlo and P.M. Lin, *Linear Circuit Analysis*, 2nd ed., Oxford University Press, 2001. 6. A.H. Robbins and W.C. Miller, *Circuit Analysis: Theory and Practice*, Thomson Learning, 4th ed., 2006.
Last Updated	June 2014
Prepared by	Dr Y.M. Lai

Subjects offered by
English Language Centre

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ELC1011
Subject Title	Practical English for University Studies
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	This subject aims to develop and enhance students' general proficiency and communication skills in English. A strong focus will be given to enhancing communicative competence and confidence in text structure, grammar, vocabulary, pronunciation and fluency.
Intended Learning Outcomes	Upon successful completion of the subject, students will be able to: a. produce short written texts in a university context using appropriate structures, vocabulary and tone b. analyse and select information from a range of text types in order to present content and views in a university context c. apply multimodal communication strategies (e.g. spoken, written, visual and aural) to present information and views for an academic audience To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present their views logically and coherently.
Subject Synopsis/ Indicative Syllabus	1. Written communication Enhancing the use of accurate and appropriate grammatical structures and vocabulary for various communicative purposes; improving the ability to organise written texts logically; and improving cohesion and coherence in writing. 2. Spoken communication Developing verbal and non-verbal interaction strategies appropriate to the context and level of formality. 3. Reading and listening Understanding the content and structure of information delivered in written and spoken texts; developing effective reading and listening strategies. 4. Language development Improving and extending relevant features of grammar, vocabulary, pronunciation and fluency. 5. Multimodal communication

<table>
<tr><td></td><td>Developing the application of multimodal communication strategies; using a range of media and modes to present information and opinions.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>The study method is a combination of seminar, self-access work and online learning. Following a blended delivery approach, activities include teacher input as well as in- and out-of-class individual and group work involving drafting of texts, information search, mini-presentations and discussions. Students will make use of elearning resources and web-based work to improve their grammar and vocabulary, and other language skills.

Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC’s Centre for Independent Language Learning. Additional reference materials will be recommended as required.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="3">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td></tr>
<tr><td>1. Extended Outline</td><td>5%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>2. Multimodal Essay</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>3. Documentary Project</td><td>65%</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="3"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The paragraph writing test, which assess students’ grammar, vocabulary and paragraph organisation skills, necessitates achievement of LOs (a) and (b).

The essay writing assessment evaluates students' ability to write a longer text ~~in~~ using accurate and appropriate structures and vocabulary (ref. LOs (a) and (b)).

The documentary presentation assesses students’ ability to speak accurately, appropriately and confidently. Students will research a topic, organise information from a variety of sources, and deliver the information as a digital documentary and mini-presentation (ref. LOs (a), (b) and (c)).

To complete further language training outside classes, students are required to participate in other face-to-face initiatives in the ELC’s Centre for Independent Language Learning. There is also language training offered in online tasks which is aligned with all the three LOs and corresponds to their learning in class.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Seminar</td><td>39 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-study/preparation</td><td>78 Hrs.</td></tr>
</table>
</td></tr>
</table>

	Total student study effort	117 Hrs.

Reading List and References	*Course material* Learning materials developed by the English Language Centre *Recommended references* Boyle, J. & Boyle, L. (1998). *Common Spoken English Errors in Hong Kong*. Hong Kong: Longman. Brannan, B. (2003). *A writer's workshop: Crafting paragraphs, building essays (3rd ed.)*. Boston: McGraw-Hill. Hancock, M. (2003). *English pronunciation in use*. Cambridge: Cambridge University Press. Nettle, M. and Hopkins, D. (2003). *Developing grammar in context: Intermediate*. Cambridge: Cambridge University Press. Redman, S. (2003). *English vocabulary in use: Pre-intermediate and intermediate*. Cambridge: Cambridge University Press. Powell, M. (2011). *Presenting in English. How to get successful presentations.* USA. Heinle & Heinle Publishers.

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ELC1012/ELC1013
Subject Title	English for University Studies (This subject will be offered in two versions for students who will primarily be using (1) APA/Harvard referencing styles or (2) IEEE/Vancouver referencing styles in their university studies.)
Credit Value	3
Level	1
Pre-requisite / Co-requisite/ Exclusion	Students entering the University with Level 3-5** from the HKDSE will be required to take this course.
Objectives	This subject aims to help students study effectively in the University's English medium learning environment, and to improve and develop their English language proficiency within a framework of university study contexts.
Intended Learning Outcomes	Upon successful completion of the subject, students will be able to: a. refer to sources in written texts and oral presentations b. paraphrase and summarise materials from written and spoken sources c. plan, write and revise expository essays with references to sources d. deliver effective oral presentations To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present information logically and coherently.
Subject Synopsis/ Indicative Syllabus	1. Written communication Analysing and practising common writing functions; improving the ability to write topic sentences and strategies for paragraph development; understanding common patterns of organisation in expository writing; taking notes from written and spoken sources; practising summarising and paraphrasing skills; improving coherence and cohesion in writing; developing revision and proofreading skills. 2. Spoken communication Recognising the purposes of and differences between spoken and written communication in English in university study contexts; identifying and practising the verbal and non-verbal interaction strategies in oral presentations; developing and applying critical thinking skills to discussions of issues. 3. Language development Improving and extending relevant features of grammar, vocabulary and pronunciation.

Teaching/Learning Methodology

The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input as well as in- and out-of-class individual and group work involving drafting and evaluating texts, mini-presentations, discussions and simulations. The process approach to writing is adopted, and students make use of elearning resources to engage in academic discussions and to reflect on their learning.

Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC's Centre for Independent Language Learning. Additional reference materials will be recommended as required.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
1. Extended proposal	5%	✓			
2. Academic essay	45%	✓	✓	✓	
3. Oral presentation	50%	✓	✓		✓
Total	100 %				

The extended proposal assesses students' ability to formulate draft arguments based on analysis and evaluation of academic texts: ref. ILO (a)

The essay assesses students' ability to produce longer written texts, in which credible source material is integrated: ref. ILOs (a), (b) and (c)

The presentation assesses students' ability to deliver persuasive and engaging digital texts and to discuss credible arguments in negotiated spoken interactions: ref ILOs (a), (b) and (d)

Students also complete independent learning components, which are a collection of compulsory activities designed to help students achieve the LOs and complete the assessments step-by-step. Activities include a range of reflective tasks, peer review activities and recorded interactive tasks. Further language training is required through web-based language work aligned with the four LOs.

Student Study Effort Expected

Class contact:	
▪ Seminars	39 hrs.
Other student study effort:	
▪ Self-study/preparation	78 hrs.
Total student study effort	117 hrs.

Reading List and References

Course materials

Learning materials developed by the English Language Centre

Recommended references

Bailey, S. (2014). *Academic writing: a handbook for international students*. Abingdon: Routledge.

	Comfort, J. (2001). *Effective presentations.* Oxford: Cornelsen & Oxford University Press. Hung, T. T. N. (2005). *Understanding English grammar: A course book for Chinese learners of English*. Hong Kong: Hong Kong University Press. Tang, R. (2012). *Academic writing in a second or foreign language: Issues and challenges facing ESL/EFL academic writers in higher education contexts*. London: Continuum International Pub. Zwier, L. J. (2002). *Building academic vocabulary.* Ann Arbor, MI: University of Michigan Press.

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ELC2011
Subject Title	Advanced English Reading and Writing Skills
Credit Value	3
Level	2
Pre-requisite / Co-requisite	Pre-requisite: ELC1012 / ELC1013 English for University Studies
Objectives	This subject aims to help students become more effective readers and writers. It focuses on developing students' facility to read a variety of texts in a critical manner, both intensively and extensively; and to write texts that demonstrate knowledge and insight.
Intended Learning Outcomes	Upon successful completion of the subject, students will be able to examine a variety of texts, including literary texts, and: a. reflect on and critically analyze texts of different genres and styles, identifying the writer's aims and stance b. identify and evaluate language used to make claims and support these with valid arguments c. write a text on a chosen topic that includes their opinion and interpretation of some key issues and demonstrates critical thinking and creativity
Subject Synopsis / Indicative Syllabus	Reading strategies Reading extensively to appreciate the use of language, acquire information, promote understanding, and develop empathy. Reading intensively to investigate a particular topic and develop an in-depth understanding of issues and stances. Reading critically to extract implications, identify writers' assumptions and purposes, and analyze issues raised in texts written from different perspectives. Writing strategies Describing and analyzing the structure, meaning and characteristics of a variety of texts. Presenting views and arguments to educated readers with sophisticated language and appropriate visual images and formats.
Teaching/Learning Methodology	The study method is primarily seminar-based. Following a blended learning approach, activities include teacher input as well as in- and out-of-class work involving sharing and discussion of reading experiences; and reading, evaluating and drafting texts. The process approach to writing is adopted, and students make use of online resources to engage in discussions and to reflect on their learning. Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to online learning resources and in the ELC's Centre for Independent Language Learning. Additional reference materials will be recommended as required.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
		a	b	c
1. Analyzing genres of writing	35%	✓	✓	
2. Multimodal Opinion or Feature Article	65%		✓	✓
Total	100%			

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment 1 requires students to employ effective critical reading and thinking skills to interpret texts, identify the writer's style and stance, and evaluate the choice of language used; and is aligned with ILOs (a) and (b). Assessment 2 requires students to first conduct research and gain some insight into a particular topic, then produce an annotated multimodal article which can inform and impress readers through its substance, structure and language; and is aligned with ILO (b) and (c). Through these assessments, students will be able to develop and demonstrate more advanced reading and writing skills.

Student Study Effort Expected

Class contact:	
Seminars	39 Hrs.
Other student study effort:	
Reflections and discussions Readings and sharing session preparation Research and drafting/revising of texts	78 Hrs.
Total student study effort:	117 Hrs.

Reading List and References

Course material
Learning materials developed by the English Language Centre

Recommended references

Best, J. (2012). *Damned lies and statistics: Untangling numbers from the media, politicians, and activists.* Berkeley, CA: University of California Press.

Cooper, S. & Patton, R. (2015). *Writing logically, thinking critically* (8th ed.). Boston, MA: Pearson.

Damer, T. E. (2013). *Attacking faulty reasoning: A practical guide to fallacy-free arguments* (7th ed.). Boston, MA: Wadsworth Cengage Learning.

Kennedy, X. J. & Gioia, D. (2016). *Literature: An introduction to fiction, poetry, drama, and writing* (13th ed.). Boston, MA: Pearson.

Metcalfe, M. (2006). *Reading critically at university.* London: Sage.

The Hong Kong Polytechnic University

Subject Description Form

Subject Code	ELC2012
Subject Title	Persuasive Communication
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: ELC1012 or ELC1013 English for University Studies
Objectives	This subject aims to help students become more persuasive communicators in a variety of contexts that they may encounter at university and in the workplace.
Intended Learning Outcomes *(Note 1)*	By the end of the subject, students should be able to communicate effectively in an English-medium environment through: a) writing persuasive texts intended for a variety of audiences b) communicating persuasively in oral contexts c) making persuasive arguments in formal discussions To achieve these, students are expected to use language and text structure appropriate to the context, select information critically, and present and support stance and opinion.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	1. Preparing for effective persuasion Assessing the situation; selecting relevant content; organising ideas and information; selecting an appropriate tone, distance and level of formality to support the communication of messages. 2. Persuasion through writing Developing and practising appropriate language, tone, style and structure; achieving cohesion and coherence. 3. Persuasion through speaking Developing and practising appropriate verbal and non-verbal skills for persuasive oral communication; improving and extending relevant pronunciation features, including articulation, pausing, intonation, word stress and sentence stress.
Teaching/Learning Methodology *(Note 3)*	The study method is primarily seminar-based. Activities include teacher input as well as individual and group work involving reading and appreciating texts, discussions and presentations of ideas. Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC's Centre for Independent Language Learning. Additional reference materials will be recommended as required.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Speech	30%		✓				
2. Persuasive written text	40%	✓					
3. Debate	30%		✓	✓			
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessment 1 is an individual speech. Assessment 2 concentrates on persuasive writing. Assessment 3 examines a different aspect of persuasion, the debate.

Student Study Effort Expected

Class contact:	
▪ Seminars	39 Hrs.
Other student study effort:	
▪ Self study/preparation	78 Hrs.
Total student study effort	117 Hrs.

Reading List and References

Required readings

ELC-provided subject materials.

Recommended references

Breaden, B. L. (1996). *Speaking to persuade.* Fort Worth, TX: Harcourt Brace College.

Covino, W.A. (1998). *The elements of persuasion.* Boston: Allyn and Bacon.

Edwards, R. E. (2008). *Competitive debate: The official guide.* New York: Alpha Books.

Leanne, S. (2008). *Say it like Obama: The power of speaking with purpose and vision.* New York: McGraw Hill.

Rogers, W. (2007). *Persuasion: messages, receivers, and contexts.* Lanham, MD: Rowman & Littlefield Publishers.

Stiff, J. B. (2003). *Persuasive communication* (2nd ed.). New York: Guilford Press.

The Hong Kong Polytechnic University

Subject Description Form

Please read the notes at the end of the table carefully before completing the form.

Subject Code	ELC2013
Subject Title	English in Literature and Film
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Pre-requisite: English for University Studies (ELC1012/1013)
Objectives	This subject aims to introduce students to a range of literary genres in English as well as to enable them to consider differences in media representations of genres, and to appreciate and negotiate the meanings of a variety of literary texts. It is also intended that the subject will help students further develop literacy, aswell as higher order thinking and life-long learning skills.
Intended Learning Outcomes *(Note 1)*	Upon successful completion of the subject, students will be able to: a. examine and analyse literary texts from different perspectives b. discuss literary techniques employed by writers c. appreciate and articulate differences in textual and visual media representations To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present and support stance and opinion.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	1. Written communication Describing and interpreting content and language in literary texts; employing appropriate grammatical structures and vocabulary. 2. Spoken communication Presenting critical evaluation of literary works effectively and convincingly. 3. Reading Developing understanding of and competence in using literary devices such as metaphor, simile and symbolism, via reading literary texts and viewing film versions. 4. Language development Improving fluency and pronunciation, and extending grammatical and lexical competence.

Teaching/Learning Methodology

(Note 3)

The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input as well as in- and out-of-class individual and group work involving listening to and viewing a variety of audio-visual sources, reading and drafting texts, conducting internet research, making mini-presentations, participating in discussions, and comparing various representations of literature. Students will make use of elearning resources and web-based work to further improve their English literacy skills.

Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC's Centre for Independent Language Learning.
Additional reference materials will be recommended as required.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
		a	b	c
1. Individual Essay	40%	✓	✓	✓
2. Group Presentation	30%	✓	✓	✓
3. Individual Project	30%	✓	✓	✓
Total	100 %			

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

In assessment 1, students are required to write an individual paper in which they critically reflect on their reading of prose, and by so doing, demonstrate their achievement of LO (a). Assessments 2 and 3 are aligned with all three LOs. Assessment 2 assesses students' understanding of a literary drama and requires comparison of the merits of its textual and theatrical versions. Assessment 3 is an individual project that requires interpretation and presentation of more creative literature and audio-visual sources.

Student Study Effort Expected

Class contact:	
▪ Seminars	39 Hrs.
Other student study effort:	
▪ Self study/preparation	78 Hrs.
Total student study effort	117 Hrs.

Reading List and References

Recommended reading
The PolyU library retains either hardcopies or electronic copies of the following titles. The titles can also be found online.

Stam, R., and Raengo, A. (eds.). (2004). *A companion to literature and film*. [electronic source] Blackwell reference online. Malden: Blackwell. Call number PN1995.3.C65 2004eb http://www.blackwellreference.com/subscriber/uid=262/book?id=g9780631230533_9780631230533&authstatuscode=202

Other readings will be specified by the ELC teacher, and may contain short

	fiction, novelettes, plays and poetry.

Subject Description Form

Subject Code	ELC2014
Subject Title	Advanced English for University Studies
Credit Value	3
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Pre-requisite: English for University Studies (ELC1012/ELC1013) (unless exempted)
Objectives	This subject aims to help students study effectively in the University's English medium learning environment, and to improve and develop their English language proficiency within a framework of university study contexts.
Intended Learning Outcomes *(Note 1)*	Upon successful completion of the subject, students will be able to: a) research relevant academic texts for a topic and integrate the sources into a position argument essay appropriately and effectively; b) plan, research for, write and revise a position argument essay; and c) present and justify views effectively in a mini oral defence. To achieve the above outcomes, students are expected to use language and text structure appropriate to the context, select information critically, and present and support stance and opinion logically and persuasively.
Subject Synopsis/ Indicative Syllabus *(Note 2)*	1. Written communication Developing logical and persuasive arguments; applying a variety of organisation patterns in discursive writing, including the writing of explanatory and evaluative texts; selecting information from academic texts critically; supporting stance; maintaining cohesion and coherence in discursive writing; achieving appropriate style and tone. 2. Spoken communication Enhancing and practising the specific oral and aural skills required to participate effectively in an academic discussion and to present and justify views in an oral defence. 3. Reading and listening Understanding the content and structure of information in oral and written texts; comprehending, inferring and evaluating messages and attitude. 4. Language development Improving and extending relevant features of grammar, vocabulary and pronunciation.

Teaching/Learning Methodology

(Note 3)

The study method is primarily seminar-based. Following a blended delivery approach, activities include teacher input as well as in- and out-of-class individual and group work involving drafting and evaluating texts, mini-presentations, discussions and simulations. The process approach to writing is adopted, and students make use of elearning resources to engage in academic discussions and to reflect on their learning.

Learning materials developed by the English Language Centre are used throughout the course. Students will be referred to learning resources on the Internet and in the ELC's Centre for Independent Language Learning. Additional reference materials will be recommended as required.

Assessment Methods in Alignment with Intended Learning Outcomes

(Note 4)

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)		
		a	b	c
1. Position Argument Essay (draft)	15%	✓	✓	
2. Academic Presentation & discussion	40%	✓		✓
3. Position Argument Essay (final)	45%	✓	✓	
Total	100 %			

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Assessments 1 and 3 assess students' abilities to produce a coherent academic text which requires research, and effective use and referencing of sources (ref. LOs (a) and (b)). Assessment 2 assesses their abilities to plan, present and justify their views in an oral defence (ref. LOs (a) and (c)).

In addition to their assessments, students complete further language training by carrying out academic research and by completing a variety of independent-learning tasks focussing on grammar and academic skills such as paraphrasing and discussion strategies.

Student Study Effort Expected

Class contact:	
▪ Seminars	39 Hrs.
Other student study effort:	
▪ Self study/preparation	78 Hrs.
Total student study effort	117 Hrs.

Reading List and References	*Course material* Learning materials developed by the English Language Centre *Recommended references* Davies, B. (2012). *Reading research: A user friendly guide for health professionals* (5th ed.). Toronto, ON: Elsevier Canada. Faigley, L. (2012). *Backpack writing: Reflecting, arguing, informing, analyzing, evaluating* (3rd ed.). Boston, MA: Pearson. Madden, C. and Rohlck, T. N. (1997). *Discussion and interaction in the academic community*. Ann Arbor, MI: University of Michigan Press. McWhorter, K. T. (2007). *Academic reading* (6th ed.). New York, NY: Pearson/Longman Oshima, A. & Hogue, A. (2006). *Writing academic English* (4th ed.). White Plains, NY: Pearson/Longman. Reinhart, S. M. (2013). *Giving academic presentations* (2nd ed.). Ann Arbor, MI: University of Michigan Press. Rost, M. (2013). *Active listening.* Harlow, England: Pearson. Wood, N. V. (2012). *Perspectives on argument* (7th ed.). Boston, MA: Pearson.

Note 1: Intended Learning Outcomes
Intended learning outcomes should state what students should be able to do or attain upon subject completion. Subject outcomes are expected to contribute to the attainment of the overall programme outcomes.

Note 2: Subject Synopsis/Indicative Syllabus
The syllabus should adequately address the intended learning outcomes. At the same time, overcrowding of the syllabus should be avoided.

Note 3: Teaching/Learning Methodology
This section should include a brief description of the teaching and learning methods to be employed to facilitate learning, and a justification of how the methods are aligned with the intended learning outcomes of the subject.

Note 4: Assessment Method
This section should include the assessment method(s) to be used and its relative weighting, and indicate which of the subject intended learning outcomes that each method is intended to assess. It should also provide a brief explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes.

Subject Description Form

Subject Code	ELC3531
Subject Title	Professional Communication in English for Engineering Students
Credit Value	2
Level	3
Pre-requisite / Co-requisite	English LCR subjects
Objectives	This subject aims to develop the language competence for professional communication in English required by students to communicate effectively with various parties and stakeholders in regard to engineering-related project proposals.
Intended Learning Outcomes	Upon completion of the subject, and in relation to effective communication with a variety of intended readers/audiences in English, students will be able to: a. plan, organise and produce professionally acceptable project proposals with appropriate text structures and language for different intended readers b. plan, organise and deliver effective project-related oral presentations with appropriate interactive strategies and language for different intended audiences c. adjust the style of expression and interactive strategies in writing and speaking in accordance with different intended readers/audiences
Subject Synopsis / Indicative Syllabus	*Synopsis* This subject enables students to develop the transferrable thinking, language, and communication skills that they will employ as aspiring professionals in the engineering field. Topics include analysis, clarity, appropriacy and persuasion in language and communication. Through a course-long engineering-related project, students will produce a professional project proposal on a creative solution which addresses problems and needs in the society, and deliver an effective pitch justifying the need for the project and the feasibility of the idea. In both tasks, students are required to demonstrate critical research and thinking when planning, organising and producing written and spoken discourses. They are also required to employ advanced language and communication strategies to convey meaning clearly, accurately, appropriately, and persuasively to different audiences.

	1. Project proposal in English • understanding and analysing problems, needs and requirements • analysing the structure and language of project proposals • extracting and evaluating information • discussing project ideas with the teacher and peers • developing and writing goals, objectives, and informed solutions based on critical analysis • integrating well-researched evidence and discipline specific knowledge clearly and convincingly • organising content logically and coherently • employing advanced language and communication strategies to convey meaning clearly, accurately, appropriately, and persuasively • producing a professional and reader-friendly document • peer-reviewing other proposals and reflecting on their project proposal 2. Project pitch in English • having a clear presentation purpose • selecting appropriate content and evidence • adapting language and style appropriate to the purpose, context and intended audience • employing advanced communication strategies and language features to convey meaning clearly, accurately, appropriately, and persuasively • speaking with clarity (including clear pronunciation) • speaking with fluency and confidence • using effective verbal and non-verbal interactive strategies • using visuals and text to support the spoken message • handling questions professionally • establishing rapport and connection with the audience
Teaching/Learning Methodology	The subject is designed to develop the English language skills, both oral and written, that students need to use to communicate effectively and professionally with a variety of stakeholders of engineering-related projects. It builds upon the language and communication skills covered in GUR language training subjects. Classes are seminar / workshop based. The lessons and materials help students to articulate and pitch their ideas in professionally acceptable language structures, text formats and registers. Activities include discussions, sample analysis, student-led investigations, process writing, peer reviews and mini-presentations. Online resources are integrated into the course for in-class and out-of-class learning.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c			
1. Project proposal in English	40%	✓		✓			
2. Project pitch in English	60%		✓	✓			
Total	100%						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Project proposal in English

The project proposal is used to assess a student's essential writing skills relevant to their field. These skills include using discipline specific concepts and knowledge to justify their rationale and approach, writing with clarity and purpose by adopting a style, structure and design which meets the funder's requirements, and using persuasive language, communication and writing strategies to win support. Embedded into this task is a consultation in which students explain the feasibility of their idea and the overall structure of their project proposal, and followed by a peer-review task in which students review and give actionable feedback to their peers.

Project pitch in English

The project pitch is applied to assess a student's ability to deliver professional and persuasive presentations to an audience relevant to the engineering field. The assignment requires students to justify their project idea, and persuade the audience to take action. Students will need to speak with fluency, clarity and purpose, pitch ideas in a style and structure appropriate to the specific audience, engage the audience, and use persuasive language and communication strategies.

Assessment type	Intended readers/audience	Timing
1. Project proposal in English Each team writes a proposal of 2000-2500 words	ELC Fund Assessment Panel (including engineering experts)	Week 7
2. Project pitch in English Each individual delivers a 5-6 minute project pitch followed by a question-and-answer session.	ELC Fund Assessment Panel and competitors	Weeks 12-13

Student Study	Class contact:	

Effort Expected	Seminars	26 Hrs.
	Other student study effort:	
	Researching, planning and writing the project proposal Rehearsing the presentation	52 Hrs.
	Total student study effort:	78 Hrs.
Reading List and References	1. D. F. Beer, Ed., *Writing and Speaking in the Technology Professions: A practical guide*, 2nd ed. Hoboken, NJ: Wiley, 2003. 2. R. Johnson-Sheehan, *Writing Proposals,* 2nd ed. New York: Pearson/Longman, 2008. 3. S. Kuiper and D. Clippinger, *Contemporary Business Reports*, 5th ed. Mason, OH: South-Western, 2013. 4. M. H. Markel, *Practical Strategies for Technical Communication*, 2nd ed. New York: Bedford/St. Martin's, 2016. 5. D. C. Reep, *Technical Writing: Principles, strategies, and readings*, 8th ed. Boston: Pearson/Longman, 2011. 6. E. D. Zanders and L. Macleod, *Presentation Skills for Scientists: A practical guide*, 2nd ed. Cambridge: Cambridge University Press, 2018.	

Subjects offered by
Faculty of Engineering

Subject Description Form

Subject Code	ENG2001
Subject Title	Fundamentals of Materials Science and Engineering
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	1. To realize the impact of the development of engineering materials on human civilization; 2. To enable students to establish a broad knowledge base on the structure and properties of materials for solving engineering problems. 3. To enable students to understand the applications and selection of engineering materials based on the consideration of properties, cost, ease of manufacture, environmental issues and their in service performance.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. comprehend the importance of materials in engineering and society; b. explain the properties and behaviour of materials using fundamental knowledge of materials science. c. apply the knowledge of materials science to analyze and solve basic engineering problems related to stress, strain and fracture of materials; d. select appropriate materials for various engineering applications taking into consideration of issues in cost, quality and environmental concerns.
Subject Synopsis/ Indicative Syllabus	1. <u>Introduction</u> Historical perspective; Evolution of engineering materials; Materials science and engineering; Classification of materials 2. <u>Atomic Structure and Structures of Materials</u> Atomic structure; Bonding forces and energies; Primary interatomic bonds and secondary bonding; Crystalline and non-crystalline materials;

Phase diagram and microstructure of alloys

3. Electrical and Optical Properties of Materials

   Conductors and insulators; Semi-conductor materials; N-type and P-type semiconductors; P/N junction; Light interactions with materials; Light emitting diode (LED) and photovoltaics; Light propagation in optical fibers; Liquid crystal; Photoelasticity

4. Mechanical Properties of Materials

   Concept of stress and strain; Stress-strain behaviour; Elastic and plastic properties of materials; Concepts of dislocations and strengthening mechanisms; Tensile properties; Elastic recovery after plastic deformation; Hardness; Stress concentration; Impact energy, Fracture toughness; Design and safety factors

5. Introduction to Failure Analysis and Prevention

   Fundamentals of fracture: ductile, brittle, fatigue and creep; Corrosion; Nondestructive testing; Techniques for failure analysis and prevention

6. Selection of Engineering Materials

   Characteristics of metallic, polymeric, ceramic, electronic and composite materials; Economic, environmental and recycling issues

Teaching/Learning Methodology

The subject will be delivered mainly through lectures but tutorials, case studies and laboratory work will substantially supplement which. Practical problems and case studies of material applications will be raised as a focal point for discussion in tutorial classes, also laboratory sessions will be used to illustrate and assimilate some fundamental principles of materials science. The subject emphasizes on developing students' problem solving skills.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d		
1. Assignments	15%	√	√	√	√		

	2. Test	20%		√	√	√		
	3. Laboratory report	5%		√	√			
	4. Examination	60%		√	√	√		
	Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The assignments are designed to reflect students' understanding of the subject and to assist them in self-monitoring of their progress.

The laboratory report is designed to assess the capability of students in analyzing and reporting experimental data relates to learning outcome (b).

The test and examination are for determining students' understanding of key concepts as well as for assessing their achievement of the learning outcomes.

Student Study Effort Expected		
	Class contact:	
	▪ Lectures, tutorials, practical	39Hrs.
	Other student study effort:	
	▪ Guided reading, assignments and reports	37Hrs.
	▪ Self-study and preparation for test and examination	47Hrs.
	Total student study effort	123Hrs.

Reading List and References

1. William D. Callister, Jr., David G. Rethwisch, *Fundamentals of materials science and engineering,* 4th edition, *E-Text*
John Wiley & Sons; ISBN: 978-1-118-53126-6

2. William D. Callister, Jr., David G. Rethwisch, *Materials Science and Engineering*, 8th edition, *E-Text*
John Wiley & Sons; ISBN: 978-1-118-37325-5

3. Materials World
(Magazine of the Institute of Materials, Minerals and Mining)

Subject Description Form

Subject Code	ENG2003
Subject Title	Information Technology
Credit Value	3
Level	2
Pre-requisite / Co-requisite/ Exclusion	Nil
Objectives	To provide the foundation knowledge in internet applications, computer networks, and database management that is essential to modern information system design
Intended Subject Learning Outcomes	Upon completion of the subject, students will be able to: Category A: Professional/academic knowledge and skills 1. Understand the functions and features of modern computing systems. 2. Understand the client-server architecture and be able to set up multiple internet applications. 3. Understand the principles of computer networks and be able to set up simple computer networks. 4. Understand the basic structure of a database system and be able to set up a simple database system. Category B: Attributes for all-roundedness 1. Solve problems using systematic approaches.
Subject Synopsis/ Indicative Syllabus	**Syllabus:** 1. Introduction to computers Introduction to information technology using Internet of Things as a real life example. Introduction to modern computing systems. 2. Computer Networks Introduction to computer networks (Client-Server Architecture). Study different internet applications (HTTP/FTP/DNS). Explain basic concepts on packet routing (Data Encapsulation/IP Addressing/Functions of Routers).

<table>
<tr><td></td><td>Introduction to basic network security measures.

3. <u>Introduction to data processing and information systems</u>
Database systems – architecture, relational database concept, structural query language (SQL), database management systems, Web and database linking, database application development. Introduction to Information systems. Workflow management.
Case study: Database design, implementation and management.</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>There will be a mix of lectures, tutorials, and laboratory sessions/workshops to facilitate effective learning. Students will be given case studies to understand and practice the usage of modern information systems.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><th rowspan="2">Specific assessment methods/tasks</th><th rowspan="2">% weighting</th><th colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th></tr>
<tr><th>A1</th><th>A2</th><th>A3</th><th>A4</th><th>B1</th></tr>
<tr><td>1. Quizzes (in tutorials)</td><td>3%</td><td>√</td><td>√</td><td>√</td><td></td><td>√</td></tr>
<tr><td>2. Quizzes (in lectures)</td><td>14%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>3. Workshops</td><td>14%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>4. Mid-term Test</td><td>11%</td><td>√</td><td>√</td><td>√</td><td></td><td>√</td></tr>
<tr><td>5. Assignment</td><td>8%</td><td></td><td></td><td></td><td>√</td><td>√</td></tr>
<tr><td>6. Examination</td><td>50%</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="5"></td></tr>
</table>
Explanation of the appropriateness of the assessment methods in assessing the intended learning outcome:

The assessment methods include an end-of-subject 2-hour written examination (total 50%) and other assessment methods (total 50%), including quizzes, a mid-term test, workshops, and an assignment, which cover intended subject learning outcomes A1, A2, A3, A4, and B1.
</td></tr>
</table>

Student Study Effort Expected	**Class contact:**	
	• Lectures (18), tutorials (6), and workshops (15)	39 Hours
	Other student study effort:	
	• Workshops preparation (6/workshop)	30 Hours
	• Self study (3/week)	39 Hours
	Total student study effort	**108 Hours**
Reading List and References	1. B. Williams and S. Sawyer, *Using Information Technology: A Practical Introduction to Computers and Communications*, 11th ed., McGraw-Hill, 2014. 2. J. F. Kurose and K. W. Ross, *Computer Networking: A Top-Down Approach*, 7th ed., Pearson, 2016. 3. D. E. Comer, *Computer Networks and Internets*, 6th ed., Pearson, 2015. 4. B. A. Forouzan, *TCP/IP Protocol Suite*, 4th ed., Tmh, 2010. *5.* W. Stalling, *Data and Computer Communications*, 10th ed., Pearson, 2013. 6. S. Morris and C. Coronel, *Database Systems: Design, Implementation, and Management*, 11th Edition, Course Technology, 2014. *7.* M. Mannino, *Database Design, Application Development, & Administration*. 6th ed., Chicago Business Press, 2014.	

Subject Description Form

Subject Code	ENG3003
Subject Title	Engineering Management
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with: 1. A practical introduction to management and a comprehensive guide to the tools and techniques used in managing people and other resources. 2. Opportunities to trace the historical development and describe the functions of management, from planning, and decision making to organizing, staffing, leading, motivating, and controlling. It also includes a discussion on engineering ethics. 3. Opportunities to explore the core business strategy, technology, and innovation, and examine how these functions intertwine to play a central role in structural design, as well as supporting an organization's overall success.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. perform tasks in an organization related to organizing, planning, leading and controlling project and process activities; b. select appropriate management techniques for improving organizational structures, work procedures, and quality performance of operational tasks; c. analyze the factors that affect changes in the work environment, and be aware of the approaches in implementing change in an organization; d. be aware of the imperatives of ethical and business behaviors in engineering organizations in a fast-changing business environment.
Subject Synopsis/Indicative Syllabus	1. <u>Introduction</u> General management concepts in organizations; Functions and types of industrial organizations; Organizational structures; Corporate objectives, strategy, and policy

<table>
<tr><td></td><td>2. <u>Industrial Management</u>

Roles of managers: Process of management, leadership, planning, organizing, motivating, and control of social and engineering activities; Quality management: Related tools and techniques

3. <u>Project Management</u>

Project scope and objectives; Network analysis; Tools that support engineering operations and task scheduling

4. <u>Management of Change</u>

Change leadership; Organizational change; Phases of planned change; Stress management; Factors that affect the execution of change

5. <u>Effects of Environmental Factors</u>

The effects of extraneous factors on the operations of engineering organizations, such as ethics and corporate social responsibilities issues</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>A mixture of lectures, tutorial exercises, and case studies are used to deliver various topics in this subject. Some topics are covered by problem-based format whenever applicable in enhancing the learning objectives. Other topics are covered by directed study so as to develop students' "life-long learning" ability.

The case studies, largely based on real experience, are designed to integrate the topics covered in the subject and to illustrate the ways various techniques are inter-related and applied in real life situations.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td><td></td><td></td></tr>
<tr><td>1. Coursework
• Group learning activities (10%)
• Presentation (individual) (30%)</td><td>40%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>2. Final examination</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td><td></td><td></td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
</td></tr>
</table>

	Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: The coursework of this subject involves students working in groups to study cases that reflect the realities of management situations in an engineering setting. Through such exercises, students' ability to apply and synthesize acquired knowledge can be assessed on the basis of their performance in group discussion, oral presentations, and the quality of their written reports on these case studies. A written final examination is also designed to assess the intended learning outcomes.	
Student Study Effort Expected	Class contact:	
	▪ Lectures and review	27 Hrs.
	▪ Tutorials and presentations	12 Hrs.
	Other student study effort:	
	▪ Research and preparation	30 Hrs.
	▪ Report writing	10 Hrs.
	▪ Preparation for oral presentation and examination	37 Hrs.
	Total student study effort	116 Hrs.
Reading List and References	1. John R. Schermerhorn, Jr., 2013, Introduction to Management, 12th Ed., John Wiley 2. Robbins, S P, DeCenzo, D A, and Coulter, M, 2013, Fundamentals of Management Essential Concepts and Applications, 8th Ed., Pearson 3. Morse, L C and Babcock, D L, 2010, Managing Engineering and Technology: an Introduction to Management for Engineers, 5th Ed., Prentice Hall 4. White, M A and Bruton, G D, 2011, The Management of Technology and Innovation: A Strategic Approach, 2nd Ed., South-Western Cengage Learning	

Subject Description Form

Subject Code	ENG3004
Subject Title	Society and the Engineer
Credit Value	3
Level	3
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject is designed for engineering students as a complementary subject on the role of the professional engineer in practice and their responsibilities toward the profession, colleagues, employers, clients, and the public. The objectives of the subject are to enable students to 1. appreciate the historical context of modern technology and the nature of the process whereby technology develops and the relationship between technology and the environment, as well as the implied social costs and benefits; 2. understand the social, political, legal, and economic responsibilities and accountability of the engineering profession and the organizational activities of professional engineering institutions; 3. be aware of the short-term and long-term effects related to safety and health, and the environmental impacts of technology; 4. observe professional conduct, as well as the legal and other applicable constraints, related to various engineering issues; and 5. develop a strong vision to optimize their contribution to sustainable development.
Intended Learning Outcomes	Upon completion of the subject, students will be able to a. identify and evaluate the effects of technology as it applies to the social, cultural, economic, legal, health, safety, and environmental dimensions of society; b. explain the importance of local and international professional training, professional conduct and ethics, and responsibilities in various engineering disciplines, particularly the Washington Accord; c. evaluate and estimate, in a team setting, the impact of contemporary issues, planned projects, and unforeseen technological advances related to engineers; effectively communicate and present the findings to laymen and peers.

Subject Synopsis/ Indicative Syllabus	1. Impact of Technology on Society Historical cases and trends of technological innovation explored through their impact on social and cultural developments of civilization and their commonalities. 2. Environmental Protection and Related Issues Roles of the engineer in energy conservation, ecological balance, and sustainable development. 3. Global Outlook for Hong Kong's Economy and Industries Support organizations, policies and their impacts on industrial and economic development in Greater China, the Pacific Rim, and the world. 4. Regulatory Organizations and Compliance Discussion of engineer's responsibilities within different regulatory frameworks and environments; Examples from various entities such as the Labor Department and the Occupational Health and Safety Council; Legal dimensions to engineering such as liability, contract law, and industrial legislation. 5. Professional Institutions Local and overseas professional institutions; Washington Accord and the qualifications and criteria of professional engineers. 6. Professional Ethics Prevention of bribery and corruption; The work of the Independent Commission Against Corruption (ICAC); Social responsibilities of engineers.
Teaching/Learning Methodology	Class comprises short lectures to provide essential knowledge and information on the relationships between society and the engineer under a range of dimensions. Other methods include in-class discussions, case studies, and seminars to develop students' in-depth analysis of the relationships. Each student will submit two assignments based on their weekly learning activities, which will be part of the subject's evaluation. The assignments will deal with important issues of social, cultural, economic, legal, health, safety, and environmental dimensions of society. Students are assembled into groups; throughout the course, they will work on engineering cases by completing the following learning activities:

1. Case analysis where students explore the relationships between society and the engineering issues of a project under specific dimensions;

2. Construction and assembly of a case portfolio which includes
   i. Presentation slides
   ii. Feedback critiques
   iii. Individual Reflections

3. Final oral presentation

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed		
		a	b	c
1. Continuous assessment	70%			
• Group weekly learning activities	(20%)	✓	✓	✓
• Individual Assignments (2)	(20%)	✓	✓	
• Individual final presentation	(15%)	✓	✓	
• Individual reflection statement	(5%)	✓	✓	
• Group project	(10%)	✓	✓	✓
2. Take-home Assignment	30%	✓	✓	
Total	100%			

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:
The coursework requires students to work in groups to study cases from the perspectives of the eight dimensions in an engineering setting. Based on these exercises, students' ability to apply and synthesize acquired knowledge can be assessed through their performance during groups' discussion, oral presentations, and the quality of their portfolio reports on the case studies.

The take-home assignment is used to assess students' critical thinking and problem- solving skills when working on their own and give students more time and flexibility to complete an assignment. It provides students the opportunity to review and extend what they have learnt in class and to check their understanding and progress.

Student Study Effort Expected	Class contact:	
	▪ Lectures and review	27 Hrs.
	▪ Presentation	12 Hrs.
	Other student study efforts:	
	▪ Research and preparation	55 Hrs.
	▪ Report and Assignments writing	25 Hrs.
	Total student study effort	119 Hrs.
Reading List and References	**Reference Books & Articles:** 1. Education for Sustainable Development - An Expert Review of Processes and Learning, UNESCO, 2011 2. Poel, Ibo van de, and Lambèr M. M. Royakkers. Ethics, Technology, and Engineering : an Introduction. Wiley-Blackwell, 2011 3. Engineering-Issues, Challenges and Opportunities for Development, USECO, 2010 4. Engineering for Sustainable Development: Guiding Principles, Royal Academy of Engineering, 2005 5. Securing the future: delivering UK sustainable development strategy, 2005 6. Johnston, F S, Gostelow, J P, and King, W J, 2000, *Engineering and Society Challenges of Professional Practice*, Upper Saddle River, N.J.: Prentice Hall 7. Hjorth, L, Eichler, B, and Khan, A, 2003, *Technology and Society A Bridge to the 21st Century*, Upper Saddle River, N.J.:Prentice Hall 8. The Council for Sustainable Development in Hong Kong, http://www.enb.gov.hk/en/susdev/council/ 9. Poverty alleviation: the role of the engineer, http://publications.arup.com/publications/p/poverty_alleviation_the_role_of_the_engineer **Reading materials:** Engineering journals: - Engineers by The Hong Kong Institution of Engineers - Engineering and Technology by The Institution of Engineers and Technology Magazines: Time, Far East Economic Review Current newspapers: South China Morning Post, China Daily, Ming Pao Daily	

Subject Description Form

Subject Code	ENG4001
Subject Title	Project Management
Credit Value	3
Level	4
Pre-requisite/Co-requisite/Exclusion	Nil
Objectives	This subject provides students with knowledge in: 1. project management tools in business organizations, taking into account the time-cost relationships, resources, processes, risks, the project life cycle, organization, and management principles; 2. project management methodologies and their application; 3. choosing project variables for effective project management; and 4. various developments of project management.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. demonstrate good understanding of definition of a project, the characteristics and project life cycle; b. identify appropriate project variables and practices that are applicable to engineering projects; c. perform project planning, cost/resources estimation, evaluate and monitor of project progress; and d. propose project management solutions, taking into consideration the project objectives and constraints.
Subject Synopsis/ Indicative Syllabus	1. <u>Project Overview, Management Principles, and the Systems Approach</u> Characteristics of projects and project management. Management principles. Project organization. Team development. Systems concepts and principles. Conflict management. 2. <u>Project Methodologies and Planning Techniques</u> Constraints: time, cost, and technical performance. Work breakdown structure. Management of scope. Scheduling tools: Gantt charts, network analysis techniques, time-phased networks, CPA, PERT, and resource smoothing. 3. <u>Cost Estimation and Cost Control for Projects</u> Types of estimates. Budgeting project costs. Experience curve. Cost schedules and forecasts. Cost control systems. 4. <u>Evaluation and Control of Projects</u> Earned value measurement system. Managing project risks. Status reporting. Project closeout and termination.

Teaching/Learning Methodology

A mixture of lectures, tutorial exercises, case studies, and laboratory work are used to deliver the various topics in this subject. Some material is covered using a problem-based format where this advances the learning objectives. Other material is covered through directed study to enhance the students' "learning to learn" ability. Some case studies are from best practices of projects, based on a literature review. They are used to integrate the topics and demonstrate to students how the various techniques are interrelated and applied in real-life situations.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed			
		a	b	c	d
1. Tutorial exercises/ written report	10%	✓	✓	✓	✓
2. Oral presentation	10%	✓	✓	✓	✓
3. End Term Test	20%	✓	✓	✓	✓
4. Written examination	60%		✓	✓	
Total	100%				

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Continuous assessment (1), (2), and (3): Test, written reports, oral presentation, and tutorial exercises are used to assess students' understanding and application of the knowledge that they have learnt relative to learning outcomes (a), (b), (c) and (d).

Written examination: questions are designed to assess learning outcomes (b) and (c).

Student Study Effort Expected

Class contact:	
▪ Lectures 3 hours/week for 9 weeks	27 Hrs.
▪ Tutorials / Case studies 3 hours/week for 4 weeks	12 Hrs.
	39 Hrs.
Other student study effort:	
▪ Preparation for assignments, short tests, and the written examination	79 Hrs.
Total student study effort	118 Hrs.

Reading List and References

1. Meredith, J. R., Shafer, S. M., Mantel Jr, S. J., 2017, *Project Management: a Strategic Managerial Approach*. John Wiley & Sons.
2. Pinto, J. K., 2020. *Project Management: Achieving Competitive Advantage*. Pearson.
3. Kerzner, H. 2017, *Project Management: a Systems Approach to Planning, Scheduling, and Controlling,* John Wiley & Sons.

	4. Project Management Institute, 2013, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide),* Fifth Edition. 5. Smith, NJ (ed.) 2008. *Engineering Project Management*, Blackwell, Oxford

Subjects offered by
Department of Management and Marketing

Subject Description Form

Subject Code	MM1031
Subject Title	Introduction to Innovation and Entrepreneurship
Credit Value	1
Level	1
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject introduces students to the essential aspects of innovation and entrepreneurship in a digital world. The objective is to prepare the first-year students with an entrepreneurial mindset and apply innovative strategies to find creative solutions that benefit both organizations and society in the age of digital transformation.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a. demonstrate an elementary understanding of innovation and entrepreneurship; b. appreciate the importance of innovation and entrepreneurship in the local and global community; c. appreciate the applications and implications of the latest technologies on entrepreneurship and innovation; and d. identify ethical issues in entrepreneurship and innovation.
Subject Synopsis/ Indicative Syllabus	This subject is built upon three pillars – **Nature and importance of innovation and entrepreneurship** Defining innovation and entrepreneurship; differences between innovation and entrepreneurship; the importance of innovation and entrepreneurship in Hong Kong and beyond; entrepreneurship as a career path; ethical issues **Innovation** Technology and innovation; technology life cycle; diffusion of innovation; technology leadership and followership; assessing technology needs; making technology decisions; sourcing and acquiring new technologies; organizing for innovation **Entrepreneurship** Technology and entrepreneurship; design thinking; value proposition canvas; business model canvas; lean start-up

Indicative Outline:

(A) Introduction

Videos (~10 minutes in total), plus discussion/activities/self-study in between the following topics

- Defining innovation and entrepreneurship
- Differences between innovation and entrepreneurship
- The importance of innovation and entrepreneurship in Hong Kong and beyond
- Entrepreneurship as a career path

(B) Innovation and entrepreneurship toolkit

Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics

- Design Thinking
- Value Proposition Canvas
- Business Model Canvas
- Lean Start-up (including MVP)

(C) Applications and implications of artificial intelligence on entrepreneurship and innovation

Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics

- Hand-written digit recognition
- Face detection
- Stock price prediction
- ROC Concept
- Chatbot applications, e.g. customer service, enquiry handling in the customer journey
- Latest A.I. development

(D) Applications and implications of blockchain technology on entrepreneurship and innovation

Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics

- Defining blockchain technology
- Background
- Applications (e.g., verifying educational or employment credentials, intellectual property, smart contract, billing and revenue allocation, rights and royalties, history of ownership – critical minerals, diamond, fine art, garment, wine and spirits, supply chains, etc.)
- Advantages and Disadvantages
- Ethical implications (e.g., cryptojacking, co-ownership of illegal data, etc.)

(E) Applications and implications of Internet of Things technology on entrepreneurship and innovation

Videos (~40 minutes in total), plus discussion/activities/self-study in between the following topics

- Defining Internet of Things technology
- Background (from 1G to 5G)

<table>
<tr><td></td><td>

- Applications (e.g., daily life, manufacturing, retail, smart cities, etc.)
- Advantages and Disadvantages
- Ethical implications (e.g., privacy, security, etc.)

(F) Managing technology for competitive advantage in a digital world

Videos (~10 minutes in total), plus discussion/activities/self-study in between the following topics

- Technology life cycle
- Diffusion of innovation
- Technology leadership and followership
- Assessing technology needs
- Making technology decisions
- Sourcing and acquiring new technologies
- Organizing for innovation

</td></tr>
<tr><td>Teaching/Learning Methodology</td><td>This subject is designed to be interactive, with short videos, cases, in-class discussions and activities interspersed throughout an introductory session and thirteen 1-hour seminars. Students are encouraged to go beyond the understanding of concepts, and to reflect on their learning process. Learning from the responses and feedback from their peers is also critical.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>

<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="4">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a</td><td>b</td><td>c</td><td>d</td></tr>
<tr><td>1. Quizzes</td><td>10%</td><td>✓</td><td></td><td></td><td>✓</td></tr>
<tr><td>2. Participation in discussion forum / journal</td><td>30%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>3. Personal Reflection</td><td>60%</td><td>✓</td><td>✓</td><td>✓</td><td>✓</td></tr>
<tr><td>Total</td><td>100 %</td><td colspan="4"></td></tr>
</table>

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

Requiring students to answer multiple-choice questions at the end of each module is appropriate for helping the first-year students confirm their understanding of the concepts. The requirement of writing some textual responses is to assess the schema established by the students toward innovation and entrepreneurship.

</td></tr>
<tr><td>Student Study Effort Expected</td><td>

<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ One online introductory session, plus four online video modules, combined with in-class discussions and activities, interspersed throughout</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Self-study and preparation</td><td>20 Hrs.</td></tr>
</table>

</td></tr>
</table>

	▪ Assignment	10 Hrs.
	Total student study effort	43 Hrs.
Reading List and References	Bateman, T. S., & Konopaske, R. (2021). *Management: Leading & collaborating in a competitive world.* NY: McGraw-Hill. Bamford, C., & Bruton, G. (2022). *Entrepreneurship: The art, science, and process for success.* McGraw-Hill. Osterwalder, A., & Pigneur, Y. (2010). *Business model generation: A handbook for visionaries, game changers, and challengers*. Hoboken, NJ: John Wiley & Sons. Osterwalder, A., Pigneur, Y., Bernarda, G., & Smith, A. (2014). *Value proposition design: How to create products and services customers want.* Hoboken, NJ: John Wiley & Sons. Ries, E. (2011). *The lean start-up*. NY: Crown Business.	

Subject Description Form

Subject Code	MM2711
Subject Title	Introduction to Marketing
Credit Value	3
Level	2
Normal Duration	1-semester
Pre-requisite / Co-requisite/Exclusion	**Exclusion**: Introduction to Marketing (MM2BN05) or equivalent
Objectives	This core subject introduces the basic principles and concepts of Marketing. It provides an analytical foundation for further study of Marketing and also contributes to the BBA Programme Outcomes in two ways. First, the content directly addresses the creation of value, ethics, cultural diversity and globalization. Second, the classroom activities and assessments develop students' teamwork, ability to communicate in English, analyse business situations by applying relevant conceptual frameworks and critical thinking.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: (a) Analyse diverse marketing situations and identify marketing opportunities and threats; (b) Apply marketing theories and models to practical marketing situations; (c) Evaluate ethical issues from a marketing perspective and suggest appropriate actions; (d) Appreciate the use of recent technology and tools in creating and delivering product values to customers **(BBA Outcome 6)**; (e) Critically select and manage information, develop and present coherent arguments on marketing issues. (f) Explore different modes of learning, understand individual learning tendencies, observe possibilities for future learning in the workplace, and reflect on readiness for learning in professional contexts. **(BBA Outcome 13)**
Subject Synopsis/ Indicative Syllabus	**Overview of Marketing** What is marketing and why is it important? The marketing process **Developing Marketing Strategies and a Marketing Plan** The marketing plan and strategic planning tools **Marketing and Society** Marketing's impact on individual consumers, society and other businesses Marketing ethics and corporate social responsibility **UNDERSTANDING THE MARKET**

	Analyzing the Marketing Environment The company's macro- and micro- environment **Consumer Behaviour** The consumer decision making process Types of buying decision behaviour Factors affecting consumer behaviour: cultural, social, personal, psychological **Business Buying Behaviour** Business to business markets Business buyer behaviour Factors affecting the buying process: buying centre, buying situations Role of the internet in business-to-business marketing **Marketing Research and Information Systems** The marketing research process Marketing information systems **VALUE CREATION** **Market Segmentation, Targeting and Positioning** Market segmentation Segmentation bases Market Targeting The positioning process and repositioning **Product and Services** Product and Service Classifications Product Decisions Product Lifecycle Branding Characteristics of services and their implications for marketing **Price** Considerations affecting pricing decisions Major pricing strategies New product pricing: skimming and penetration pricing Price adjustment strategies **Distribution** Nature and importance of marketing channels Channel design decisions: channel structure, distribution intensity Channel management **Promotion** The communication process AIDA model Importance of integrated marketing communications Designing the promotion mix Setting the promotion budget
Teaching/Learning Methodology	The two-hour weekly lecture aims to guide and promote students' understanding of relevant concepts. The weekly one-hour tutorial activities include discussions on case studies, contemporary marketing topics and journal articles. Students will also work in groups to prepare and make presentations, and to critique the work presented by others. Emphasis is placed throughout on the application of theory to the solution of practical and realistic marketing problems in the local and global setting.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	*% weighting*	*Intended subject learning outcomes to be assessed (Please tick as appropriate)*					
		a	b	c	d	e	f
Continuous Assessment	**50%**						
1. Individual essay	15%				✓	✓	✓
2. Group project(s) and presentation	20%	✓	✓	✓	✓	✓	
3. Individual contribution to class discussions	15%					✓	
Examination	**50%**	✓	✓		✓	✓	
Total	100 %						

**Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.*

To reflect the significant technology content in this subject, 10% *(or more)* of the overall weighting of this subject is based on individual assessment concerning technology-related knowledge.

To pass this subject, students are required to obtain Grade D or above in the overall subject grade.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: the above methods are designed to ensure that all students –

- Read the recommended material;
- Discuss the issues brought up in the lectures/seminars;
- Appreciate the different approaches that may be adopted in solving marketing problems and
- Participate in presenting the group's views on a case/marketing situation.

Feedback is given to students immediately following the presentations. All students are also invited to join the discussion.

Student Study Effort Required

Class contact:	
▪ Lectures	26Hrs.
▪ Seminars	13 Hrs.
Other student study effort:	
▪ Preparation for tutorials and presentation	26 Hrs.

	▪ Reading and essay writing	21 Hrs.
	▪ Self study in preparation for exam	40 Hrs.
	Total student study effort	126 Hrs.
Reading List and References	***Recommended Textbook and References*** ***Recommended Textbook*** Kotler, P., Armstrong, G., Ang, S.H., Leong, S.M., Tan, C.T. and Wang, Y (2022) ***Principles of Marketing: An Asian Perspective***, GlobalEdition, 5th edition, Pearson. ***References*** Kerin, R. A., Hartley, S. W. and Rudelius, W. (2023), ***Marketing***, 16th edition, Singapore, McGraw-Hill. Grewal, D. and Levy, M. (2021) ***Marketing***, 8th Edition, New York, McGraw-Hill. Various newspapers, magazines, journal articles and web addresses will be referenced.	

July 2024

Subject Description Form

Subject Code	MM3761
Subject Title	Marketing Research
Credit Value	3
Level	3
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** Introduction to Marketing (MM2711) or Introduction to Marketing (MM2BN05) or Marketing (MM273) and Introduction to Probability and Statistics (AMA217) or Quantitative and Computational Methods (ME3903) or Quantitative Methods for Business (AMA2101/LGT2105) or Quantitative Methods (ISE206) or Probability & Engineering Statistics (AMA302/AMA305) or Statistics and Mathematics for Textiles (ITC241) or equivalent
Objectives	It provides an understanding of the underlying concepts of marketing research and the importance of information to the making of marketing decisions. It aims to introduce students the basic marketing research techniques and to develop their ability to interpret marketing research findings.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: a. explain the nature and scope of marketing research; b. describe its role in designing and implementing successful marketing programs; c. use statistical programs for analyzing and interpreting marketing research data, and recognizing new data sources in the marketplace; **(BBA Outcome 14)** d. use and evaluate marketing research, and to design simple research investigations.
Subject Synopsis/ Indicative Syllabus	- Introduction to Marketing Research /Research Problems and Research Objectives - An Overview of Data Sources - Qualitative Methods and Survey Methods - Measurements and Designing Questionnaires - Sampling Procedures and Sample Size - Preparing Data for Analysis (including descriptive statistics) - Univariate Data Analysis (including one sample t-test) - Bivariate Analysis (including mean comparison tests, chi-square test, correlation analysis, and simple linear regression) - Multivariate Data Analysis (including factor analysis and multiple regression)
Teaching/Learning Methodology	This subject is taught in thirteen three-hour sessions on a weekly basis. The sessions consist of formal lectures, seminar discussions and computer workshops. Active student participation is expected. Lectures cover the main theoretical, conceptual and technical aspects of the syllabus. Computer workshops are used for students to gain hands-on experience of application software in analyzing survey data. The other activities are for developing and integrating the materials in the subject.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	*% weighting*	*Intended subject learning outcomes to be assessed (Please tick as appropriate)*			
		a	b	c	d
Continuous Assessment*	**50%**				
1. Participation	10%	✓	✓		✓
2. Individual assignments - Analyzing Data - Reviewing new data sources	20%	✓	✓	✓	✓
3. Group Project	20%	✓	✓		✓
Examination	**50%**	✓	✓		✓
Total	**100 %**				

**Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.*

To reflect the significant technology content in this subject, 10% *(or more)* of the overall weighting of this subject is based on individual assessment concerning technology-related knowledge.

To pass this subject, students are required to obtain Grade D or above in the overall subject grade.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: the various methods are designed to ensure that all students taking this subject are able to –

- Demonstrate a basic understanding of concepts/theories;
- Possess the ability to apply concepts/theories to real situations and prepare a simple research proposal
- Solve problems in business settings
- Apply concepts/theories in a given situation and solve problems
- Use statistical programs for analyzing and interpreting marketing research data

Student Study Effort Required

Class contact:	
▪ Lectures	39 Hrs.
Other student study effort:	
▪ Preparation for lectures	14 Hrs.
▪ Preparation for data analysis tests, in-class exercises, take-home assignments, and final examination	56 Hrs.
Total student study effort	109 Hrs.

Reading List and References

Recommended Textbook
Burns, Veeck, and Bush, Marketing Research, 8/E (Prentice Hall).

References
Aaker, Kumar and Day, Marketing Research 11/E (Wiley).
Churchill & Iacobucci, Marketing Research: Methodological Foundations, 12/E (South-Western).
Journal of Marketing Research
Journal of Consumer Research
Journal of Marketing
Marketing Science

Subject Description Form

Subject Code	MM4711
Subject Title	Business to Business Marketing
Credit Value	3
Level	4
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** Introduction to Marketing (MM2711) or Introduction to Marketing (MM2BN05)or equivalent
Objectives	This advance subject aims to enhance students' abilities to analyze sales and marketing activities in a Business environment and achieves a number of BBA Programme Outcomes. It directly addresses the roles and the interactional dynamics of a buyer and a seller in the value-added manufacturing context (Outcome 11 & 12). It also perceives a seller from a problem solver's perspective and how this seller helps improve a buying organization that is internally guided by its product innovation, cost management, and marketing programs and externally influenced by its domestic and global economic environment (Outcome 9 & 13). The seminars, class activities and assignments develop students' abilities in English communication and creative thinking skills (Outcome 1 & 4).
Subject Learning Outcomes	Upon completion of the subject, students will be able to: (a) Understand the nature and scope of business-to-business market and the differences between consumer marketing and business marketing (**BBA Outcome 14**); (b) Apply buying models and theories to analyze organizational buying behavior; conceptualize the business dynamics in the business market; (c) Formulate and evaluate higher level marketing strategies (targeting, segmentation, positioning and differentiation) and lower level strategies (product, pricing, channels of distribution and promotions) in different business marketing settings; (d) Propose and evaluate relationship strategies in a business-to-business interactional environment.
Subject Synopsis/ Indicative Syllabus	**Business Marketing Perspective** Marketing to different types of business organizations, appreciating the cost and profit context of business and economic environment; explaining the differences between business and consumer marketing. **Organizational Buying Behavior** Recognizing the strategic goals of purchasing, the procurement procedures, and buying situations in the business, government, and institutional organizations; acknowledging the relationships between strategic purchasing goals, cost drivers, cost reduction program and revenue enhancement. **Relationship Management** Appreciating the relationship spectrum; recognizing the relationship between collaboration and operational linkage; formulating relationship program; searching relationship dimensions; acknowledging the differences between western and Chinese relationship management. **Business Market Segmentation** Segmenting the business market; supporting segmentation through technology

	environment and product differentiation; the relationship between segmentation and sales planning. **Business Product Mixes** Creating product core competence through value chain; Classifying business product; Improving product positioning through quality management. **Business Pricing Mixes** Perceiving pricing from a cost perspective; deriving target cost management procedures; recognizing the relationship between price, cost and profit. **Business Placing Mixes** Classifying direct and indirect placing option; delineating the role of direct sales offices, distributors, and manufacturer representatives/agencies; evaluating and managing alternative placing methods. **Business Promotion Mixes** Recognizing the functions of business promotion; appreciating the role of integrative marketing communications through trade shows, conferences, personal selling, and other below-the line advertising tools.
Teaching/Learning Methodology	Students are encouraged to participate in class discussions for both lectures and seminars. To facilitate students' ability of lateral thinking and to apply theories, case scenarios will be stressed in teaching. Students will form groups, each of which is in charge of presenting two cases with external search of information from internet, newspapers, company annual reports etc. In addition, an individual/group assignment will be used to integrate student's understanding of all taught materials.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	*% weighting*	*Intended subject learning outcomes to be assessed (Please tick as appropriate)*			
		a	b	c	d
Continuous Assessment	**50%**				
1. Class participation	10%	✓	✓	✓	✓
2. Group presentation and report	15%	✓	✓	✓	✓
3. Individual/ group assignment	25%	✓	✓	✓	✓
Examination	**50%**	✓	✓	✓	✓
Total	100 %				

**Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.*

To pass this subject, students are required to obtain Grade D or above in the overall subject grade.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: the various methods are designed to ensure that all students taking this subject –

- Read all prescribed book chapters prior to every lecture;
- Exchange ideas on the issues raised in the lectures/seminars;
- Evaluate alternative strategies/approaches in different business situations;
- Involve/participate in presentations and express views and comments on how to solve business problems.

edbacks will be given to students immediately after their presentation. All students are encouraged to give their views.

Student Study Effort Expected

Class contact:	
▪ Lectures	26Hrs.
▪ Tutorials	13Hrs.
Other student study effort:	
▪ Preparation for presentation & report	48 Hrs.
▪ Preparation for assignment/examination	50 Hrs.
Total student study effort	137 Hrs.

Reading List and References

Recommended Textbooks and References

Recommended Textbook

Hutt, Michael D and Speh, Thomas W (updated) ***Business Marketing Management: B2B, Thomson South Western***, E-Edition.

Subject Description Form

Subject Code	MM4721
Subject Title	Marketing Management in China
Credit Value	3
Level	4
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** Introduction to Marketing (MM2BN05) or Introduction to Marketing (MM2711) or equivalent
Role and Purposes	This course is designed to develop the students' understanding of China's marketing environment and marketing system. Specifically, it will be highly application-based, with the sharing of various business cases by the top marketing executives of various industries at various classes. The students will be exposed to the complexities of consumer behavior and marketing strategies in China and will develop an understanding of the dynamics and indigenous characteristics of a variety of industries. Through case studies, application exercises, and group projects, students will apply marketing insights and will be able to formulate effective and novel marketing strategies to compete and succeed in the growing competitive markets in China. In addition to the above mentioned, the effective leadership in building a dynamic marketing management team with a cross-cultural moderating mindset will be heavily emphasized during the course.
Subject Learning Outcomes	(a) Realize the trend of economic changes in history so as to establish a pre-economic change mindset (b) Understand the major marketing concepts, strategies, and necessary tools to develop a marketing plan for the China market (c) Identify the unique characteristics of the China market and their implications for effective marketing management (d) Understand Chinese consumer behavior and consumption patterns (e) Identify and assess the key trends and issues in China marketing (f) Conduct in-depth analysis and formulate marketing strategies for the China market (g) Develop the winning and profitable brand/product portfolio with the practical M & A approaches (h) Establish workable people-oriented leadership in the effective marketing management

Subject Synopsis/ Indicative Syllabus	**1. Overview of Economic Trend in China** The study of the economic development history of China for forming a basic understanding about the unique trend of the consumer market. **2. China's Market Characteristics** This part covers the unique features of the China market, its dynamics and potential. The teaching will touch the interactions between the marketing environment and the macro-environment development. Reviews will be made on the transformation from the nature of multi-markets into a one-market in the coming decade through the rapid development of the information and communication technology. **3. Chinese Consumer Behavior** Review on the distinctive characteristics of Chinese buyers' purchasing behavior through the analysis on the development of different industries and market segments of the same industry. The impact of cultural, government regulations, brand owners' conducts on buying behavior will be covered. The course also covers changes in consumption patterns and the forces underlying such changes from the perspective of internet, AI and social media. **4. Product and Innovation in China** With the study on the recent development of various brands and products of different industries, the teaching will focus on the most impactful elements in the modern marketing management: innovation and product characteristic building. Student will get the chance to go through unique cases of brand/product development in China (the transformation from international single brand into multi-local brands) so to generate knowledge in "thinking out of the box" in marketing management. **5. Brand Portfolio Building in China** In this part, based on the real business cases, students are led to go through the overall strategic planning on rejuvenating the outdated brands, creating new brands and launching international brands simultaneously. Detailed analysis on the building of a unique portfolio covering the aforesaid categories into powerful profit generators in the China market. **6. Advertising and Social-Media in China** Besides the general introduction to the A+ P strategic planning in China, real business cases are prepared for sharing with the students. The focus will be on leveraging the growing popularity of certain social media including the KOL for establishing sustainable growth of profit through strategic marketing management. **7. Effective Leadership in Marketing Management** Effective leadership in marketing management with the total echoes of all the stakeholders of the organization and even the industry is vital to the sustainable growth of the business. It is the blood tube of the organization and the smooth execution of leadership guarantees the best possible cost-effectiveness in marketing management. **8. M & A in Marketing** The M & A mindset always trigger successful marketing management, which leads to the sustainable growth of the overall business of an organization. During the course, this extremely important practical thinking will be precisely demonstrated with good discussions.

<table>
<tr><td>Teaching/Learning Methodology</td><td>Lectures, guest speakers' co-teaching and the lecturer's various business cases are the core of the course. The lecturer's personal involvement in all the team projects is one of the unique points of the course.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><td rowspan="2">Specific assessment methods/tasks</td><td rowspan="2">% weighting</td><td colspan="6">Intended subject learning outcomes to be assessed (Please tick as appropriate)</td></tr>
<tr><td>a & b</td><td>c</td><td>d</td><td>e</td><td>f</td><td>g & h</td></tr>
<tr><td>Continuous Assessment*</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>1. Class Participation</td><td>15%</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>2. Individual Reflection</td><td>10%</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>3. Individual Case Report</td><td>25%</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>4. Group Project</td><td>15%</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Final Group Presentation</td><td>35%</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td><td>☐</td></tr>
<tr><td>Total</td><td>100%</td><td colspan="6"></td></tr>
</table>
*Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.

To pass this subject, students are required to obtain Grade D or above in the overall grade.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: the various methods are designed to ensure that all students taking this subject to have a balanced learning experience.
#Attendance of students.
</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lectures & guest sharing</td><td>39 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Preparation for lectures</td><td>40 Hrs.</td></tr>
<tr><td>▪ Preparation for assignments, group projects, and presentations</td><td>60 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>139 Hrs.</td></tr>
</table>
</td></tr>
</table>

Reading List and References	**Recommended Books:** ▪ Lala Hu, International Digital Marketing in China: Regional Characteristics and Global Challenges, Palgrave Pivot, 2020. ▪ Lauren Hallanan and Ashley Galina Dudarenok, Digital China: Working with Bloggers, Influencers and KOLs, 2018. ▪ Lianne Yu, Consumption in China: How China's New Consumer Ideology is Shaping the Nation (China Today), Polity, 2014. ▪ Tom Doctoroff, Billions: Selling to the New Chinese Consumer, St. Martin's Press, 2015. ▪ Tom Doctoroff, What Chinese Want: Culture, Communism, and China's Modern Consumer, Palgrave MacMillan, 2012. ▪ Val Kaplan, Doing Business in China Online: The Most Comprehensive Guide to Digital Marketing in China, 2017. ▪ Royce Yuen, Decoding Branding: A Complete Guide to Building and Revamping Brands in the Age of Disruption, Routledge, 2021 ▪ Jeffrey Towson & Jonathan Woetzel: The 1 Hour China Consumer Book, The Towson Group LLC, 2015

Subject Description Form

Subject Code	MM4732
Subject Title	Global Marketing
Credit Value	3
Level	4
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** Introduction to Marketing (MM2BN05) or Introduction to Marketing (MM2711) or equivalent **Exclusion:** International Marketing (MM4731)
Objectives	The purpose of this subject is to provide students a rigorous theoretical grounding against which international marketing problems and issues may be systematically synthesized, analyzed, and managed. The focus is on the analysis of the global operating environment and the management of international marketing operations. Specially, this subject contributes to the BBA Project Outcomes in transforming students to be culturally diversity and globalized, analytical, value creation, creative, ethical, and sensitive to domestic and global business environments.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: a. demonstrate a global outlook and an understanding of how cultural, social, economic, political, and organisational factors affect the practice of marketing in foreign countries **(BBA Outcome 14)** b. identify and evaluate opportunities for organizational expansion into new foreign markets; c. formulate effective marketing strategies in response to perceive opportunities in foreign markets; d. apply knowledge learned to the creative solution of problems confronting organizations operating in cross-cultural environments; e. appraise the social, ethical and commercial implications of implementing marketing strategies across different cultural contexts; f. exhibit leadership and interpersonal skills working together in teams to obtain creative solutions to international marketing problems.
Subject Synopsis/ Indicative Syllabus	**Global marketing environment:** Challenges of marketing in the global marketplace, the global economy, cultural and social forces, political, and legal forces **Analyzing foreign markets:** Global markets and buyers, country attractiveness, international marketing research **Developing global marketing strategies:** Developing a global mindset, entry strategies, issues of standardization and adaptation **Designing global marketing programs:** Global product and service strategies, managing global distribution channels, global promotion strategies, pricing for global markets **Managing global marketing process:** Organizing global marketing, planning and controlling global marketing programs
Teaching/Learning Methodology	This subject is taught through a mix of lectures and tutorials. Lectures are used to explain and illustrate concepts and theories in international marketing while tutorials provide

opportunities for group discussion and sharing, case study, and presentation. Active participation is expected, with activities designed to encourage the application of concepts and theories in resolving global marketing problems.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended Subject Learning Outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	f
Continuous Assessment	**100%**						
Individual exercise/ assignment	50%	✓	✓	✓	✓	✓	
Participation	10%	✓	✓	✓	✓		✓
Group project/ presentation	40%	✓	✓	✓	✓	✓	✓
Total	**100 %**						

**Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.*

To pass this subject, students are required to obtain Grade D or above in the overall subject grade.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The above assessment methods are designed to ensure that all students:

- Read the recommended materials
- Discuss the global marketing issues brought up in the lectures and tutorials
- Appreciate the different approaches that may be adopted in solving global marketing problems
- Participate in presenting the group's views on various current marketing issues at the global context

Student Study Effort Expected

Class contact:	
▪ Lectures	26Hrs.
▪ Tutorials	13Hrs.
Other student study effort:	
▪ Reading & discussion	42Hrs.
▪ Assignments & quiz/test	42Hrs.
Total student study effort	123Hrs.

Reading List and References

Receommended Textbooks and References

Recommended Textbooks

Keegan, Warren and Mark C. Green (2019). ***Global Marketing,*** 10th edition. Upper Saddle River, N.J.: Pearson/Prentice Hall.

Other Suggested Text

Academia Journals

Journal of Marketing
Journal of International Business Studies
Journal of International Marketing

	International Marketing Review International Business Review Journal of Global Marketing ***Practitioner Journals*** Harvard Business Review MIT Sloan Management Review California Management Review Business Horizons

Subject Description Form

Subject Code	MM4782
Subject Title	Sales and Distribution Management
Credit Value	3
Level	4
Normal Duration	1-semester
Pre-requisite/ Co-requisite/ Exclusion	**Pre-requisite:** Introduction to Marketing (MM2711) or Introduction to Marketing (MM2BN05) or equivalent **Exclusion:** Marketing Channel Management (MM3782) and Sale Management (MM4781)
Role and Purposes	This subject provides an overview of the sales and distribution management. It discusses various sales functions ranging from various sales organization structures to the role of the sales manager in improving sales by hiring, training, motivating and leading the sales force. It also discusses distribution function and marketing channel management. This subject is designed to provide students with current theories and practices for developing and managing a sales force, and solid and proficient skills in managing marketing channels. Students study the topics of sales management from the managerial point of view and the selling process approach. In addition to learning sales function, the subject strives to equip students with a thorough understanding of and an ability to manage marketing channels for making the products available to final consumers.
Subject Learning Outcomes	Upon completion of the subject, students will be able to: a. Identify the nature of *managerial work* in a variety of forms of organization, and assess the impact of the external environment on managers' jobs. b. Understand the essence of *human and CRM behavior* and be able to assess the implications for the management of organizations and businesses. Understand essential elements of the *selling process*. Beable to evaluate the arguments surrounding social responsibility and ethical behaviour in business, and an enhanced awareness of the importance of such issues. c. Analyze and evaluate the managing distribution in the context of managing channels of distribution as well as physical distribution, and then to acquire a solid foundation on both dimensions. d. Apply the channel management concepts in real commercial settings and learn how products to be physically distributed in effective ways in terms of the total cost borne by all related parties based on logistics and channel management cases drawn from local and international perspectives.

Subject Synopsis/ Indicative Syllabus	**Nature and Scope of Sales Management** Key features: Sales-force management in the total marketing programme. Relationship between sales management and other marketing and managerial functions. Responsibilities of the sales manager. Sales environment. To discuss sales management's tasks in a company with a customer orientation and outline its roles in relation to other marketing mix variables. Students are expected to know how the nature of sales management has changed, what managerial challenge face sales managers and how environmental factors affect the sales activities of the company. Key steps of the selling process include prospecting, preparation, presentation, handling objections, closing the sale and follow-up activities. To trace the evolution of modem selling and discuss the roles of personalselling today. Students are expected to have key ideas about typical problems encountered in doing personal selling and how they can be resolved. Extensive use will be made of role playing exercises. **Nature and Scope of Marketing Channel Management** Key features: Channel concept. Selecting, motivating and evaluating channel members. Working with channel members on issues related to product, price and promotion. Channel conflict and power. To discuss marketing channels as a competitive advantage to firms as other forms of traditional competitive differentiations can be copied and followed easily. Students are expected to learn channel management as a separate marketing function that involves efficient channel design, conflict management and implementation of sophisticated channel information systems which will enhance the process of making the products available to final consumers in a timely manner. To discuss the roles of marketing channel manager today. Students are expected to know how “place” as a key component of strategic marketing and understand this growing awareness of the importance of marketing channels, in the content of a firm’s overall marketing objectives.
Teaching/Learning Methodology	Students are encouraged to participate in class discussions for both lectures and seminars. They are required to finish weekly reading assignments before the lecture. To facilitate students’ ability to apply theories, case studies will be stressed in teaching, including cases assigned for discussion in class and a project assigned as field work. Students are required to form groups to conduct the projects dealing with real firms. Formation of student groups and topics for case studies will be discussed in detail during class and consultation hours.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)			
		a	b	c	d
Continuous Assessment	**50%**				
1. Individual Paper	15%	✓		✓	
2. Group Presentation	15%		✓		✓
3. Group Project	15%		✓		✓
4. Individual Participation	5%		✓		✓
Examination	**50%**	✓		✓	
Total	100 %				

**Weighting of assessment methods/tasks in continuous assessment may be different, subject to each subject lecturer.*

To pass this subject, students are required to obtain Grade D or above in the overall grade.

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes: the various methods are designed to ensure that all students taking this subject –

- Understand and analyse the issues and concepts of sales and distribution management;
- Read relevant chapters of the recommended textbook and other relevant learning material including research journal articles, cases & reports, etc.
- Appreciate alternative approaches, perspectives and theories to deal with various sales and distribution management issues;
- Undertake critical reflective thinking and practice about innovative ways of thinking and new ways of selling and distributing products.

Feedback is given to students after they have presented their view and all students are invited to join this discussion.

As indicated in the table above, all assessments including the final examination are in alignment with all four intended subject learning outcomes that, in turn, match the BBA outcome. All individual assessments evaluate the BBA outcome and, therefore, the overall subject grade (as the summary of the results of the all assessments) is used as an indicator to evaluate to what extent the BBA outcomes are matched.

Student Study Effort Expected	Class contact:	
	▪ Lectures	26 Hrs.
	▪ Seminars	13 Hrs.
	Other student study effort:	
	▪ Preparation for discussion	42 Hrs.
	▪ Preparation for project/assignment/tests	42 Hrs.
	Total student study effort	123Hrs.
Reading List and References	**Textbook** Johnston, M.J. & Marshall, G.W. (2020). *Sales Force Management: Leadership, Innovation, Technology (13th ed)*, Routledge. Palmatier, R.W., Sivadas, E., Stern, L.W. & El-Ansary, A.I. (2019). *Marketing Channel Strategy: An Omni-Channel Approach* (*9th* ed), Routledge. **Key Reference** Dent, J. & White, M. (2018). *Sales and Marketing Channels: How to Build and Manage Distribution Strategy* (*3rd ed*), Kogan Page.	

Subjects offered by School of Design

Subject Description Form

Subject Code	SD348
Subject Title	Introduction to Industrial Design
Credit Value	3
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject gives an introduction to the field of industrial design as a creative discipline, a discipline which synthesises knowledge from fields as diverse as arts, sciences and engineering. Industrial design is known for its capacity to innovate and to add value to products and services. Industrial designers solve problems centred on user needs with the intent to improve the quality of people's lives. The design process incorporates unique problem solving methods and creativity process. Industrial design intends to work with technological and ecological parameters in an appropriate way. The development and use of state of the art tools and technologies puts industrial design in a significant position socially and economically. The subject aims to equip students with knowledge and experience of industrial design to appreciate the profession, relate to its practitioners in different work situations, employ the design process appropriately for problem identification, solving and innovation, and to realise the importance of a user centred approach to the creation of new products and services. The subject is project-oriented that the students are expected to learn through a design project. The subject does not include any engineering skill, such as software application. The students are expected to apply the technological and engineering knowledge, skills and experience obtained from other subjects to tackle the project.
Intended Learning Outcomes	Upon completion of the subject, students will be able to basic knowledge to: a. Appreciate the industrial/product design profession, relate to its practitioners in different work situations. b. Employ the design process appropriately for problem solving and innovation. c. Realise the importance of a user centered approach to the creation of new products and services. d. Apply visualisation skill in project presentation. e. Understand objectives of industrial/product design, and apply knowledge and experience in other related subjects and future career.

Subject Synopsis/ Indicative Syllabus

The field of industrial design is introduced through a series of lectures featuring a review of milestones of design achievements internationally and locally. The relationships between design, culture and society are highlighted through a look at topics like cultural identity in product design, user centred design, employment of technologies, and design and sustainability.

Further lectures and seminars cover two major parts of industrial design and its professional practice:

1. The essentially theoretical foundation of the industrial design process and methodology covering topics such as:
   - Design and culture
   - Form, aesthetics and semantics
   - Human factors and ergonomics in design
   - Research and problem identification
   - Design requirements and design brief
   - Design development and specifications
   - Design evaluation and concept selection

2. The essentially practical aspects of the industrial design process covering topics such as:
   - Design visualisation, presentation and communication
   - Product prototyping and user testing
   - Manufacturer and marketing relations

Teaching/Learning Methodology

Emphasis in the practical learning activities is placed on students' creativity in relation to designing. Students explore different approaches to problems and experience methods of problem solving with the designer's tools.

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1. Design project: Understanding design process	10	✓	✓	✓	✓	✓	
2. Design project: investigation and application in design	30		✓	✓		✓	
3. Design project: development of design ideas	45	✓	✓	✓	✓	✓	

	4. Design project: presentation of design ideas	15				✓	✓	
	Total	100 %						
	Project and continuous assessment approaches are adopted in the subject.							

Student Study Effort Required	Class contact:	
	▪ Lectures and seminars	26 Hrs.
	▪ Tutorials and exercises	13 Hrs.
	Other student study effort:	
	▪ Research and design	31 Hrs.
	▪ Preparation of presentation	10 Hrs.
	Total student study effort	80 Hrs.

Reading List and References

1. *Design Issues. The MIT Press. (Journal)*
2. *Design Management Journal. The Design Management Institute. (Journal)*
3. *Design Studies. Elsevier Science. (Journal)*
4. *International Journal of Design (Journal)*
5. *The Design Journal (Journal)*
6. *Forest, D. (Ed.) (2014). The art of things: Product design since 1945. New York: Abbeville Press Publishers.*
7. *Fung, A., Lo, A., & Rao, M. N. (2005). Creative tools. Hong Kong: School of Design, The Hong Kong Polytechnic University.*
8. *Graedel, T. E. (2003). Industrial ecology (2nd ed.). Upper Saddle River, NJ: Prentice Hall.*
9. *Jordan, P. W. (1997). Putting the pleasure into products. IEE Review, Nov. 1997, 249-252.*
10. *Koos, E. (2014). Sketching product design presentation. Amsterdam, The Netherlands: BIS.*
11. *Leung, T. P. (Ed.) (2004). Hong Kong: Better by design. Hong Kong: The Hong Kong Polytechnic University.*
12. *Mackenzie, D. (1997). Green design: Design for the environment (2nd ed.). London: Laurence King.*
13. *Monika, H. (2013). Branding and product design: An integrated perspective. Surrey, England: Gower Publishing Limited.*
14. *Norman, D. A. (1998). The invisible computer: Why good products can fail, the personal computer is so complex and information appliances are the solution. Cambridge, Mass., London: The MIT Press.*
15. *Norman, D. A. (1998). The design of everyday things. London: The MIT Press.*
16. *Richard, M. (2016). The fundamentals of product design (2nd ed.). London: Fairchild Books.*
17. *Rodgers, P. (2011). Product design. London: Laurence King.*
18. *Roqueta, H. (2002). Product design. London: Te Neues.*

	19. *Rowe, P. G. (1987). Design thinking. Cambridge, Mass.: The MIT Press.* 20. *Siu, K. W. M. (Ed.) (2009). New era of product design: Theory and practice (Chinese ed.) Beijing: Beijing Institute of Technology Press.* 邵健偉 編著（*2009*）：《產品設計新紀元：理論與實踐》。北京：北京理工大學出版社。 21. *Stanton, N. (Ed.) (1998). Human factors in consumer products. London: Taylor & Francis.* 22. *Ulrich, K. T. (2004). Product design and development (3rd ed.). New York, NY: McGraw-Hill/Irwin.* 23. *Wang, S. Z. (1995). A history of modern design 1864-1996. Guangzhou: Xin Shi Ji Chu Ban She.* 24. *Whiteley, N. (1993). Design for society. London: Reaktion Books.*

Subject Description Form

Subject Code	SD4041
Subject Title	Design in Business for Engineering
Credit Value	3
Level	4
Pre-requisite/ Co-requisite/ **Exclusion**	SD348 Introduction to Industrial Design ME49003/ME49005 Capstone Project **OR** ISE445 PEM Capstone Project Nil
Objectives	Upon completion of the subject, students will be able to: To apply a model of strategies and processes to a Level 4 product development project undertaken concurrently to support the creation and development of a breakthrough product and services. The model includes the following: 1. Methods to obtain insights into emerging trends in consumer and industrial markets. 2. A means to navigate and control the 'fuzzy front end' of the product development process. 3. The use of qualitative research to understand who the customer is. 4. Techniques to assist in the integration of diverse team players. 5. A complete product development process from opportunity identification to patenting. 6. An approach that connects strategic planning and brand management to product development.
Intended Learning Outcomes	a. Formulate a design problem addressing certain market needs and to develop design specifications with due consideration of industrial design. b. Generate alternative design concepts, and then evaluate each of these concepts by considering the impacts of various important factors related to business. c. Apply arts, mathematics, information technology, material technology and manufacturing processes via analytical and computational approaches to realize a selected design concept. d. Understand the importance of life-long learning and perform literature search to upkeep with the state-of-the-art product design technology. e. Work effectively as a member or the leader in a multi-disciplinary design project team, and able to present a design project via oral presentation and written report.

Subject Synopsis/ Indicative Syllabus	The syllabus sets out the sequence for developing a breakthrough product/service and is delivered concurrently with the Capstone Project which has this objective. The process for new product development is as follows: ***Stage 1 - Identifying the Opportunity*** a) Interpret the interconnected factors of Social Change, Economic Trends, and Technological Innovation that lead to the Identification of Product Opportunity Gaps in the marketplace, for both products and services. b) Examine the concept of the Positioning Map, which shows how break-through products and services are differentiated from the competition by Style, Technology and Value. ***Stage 2 - Understanding the Opportunity*** Examine the complex combination of value attributes that connect breakthrough products/services to people's lifestyles. Turn insights into product concepts, list product characteristics and constraints. ***Stage 3 - Conceptualizing the Opportunity*** Turn value opportunities into useful, useable, and desirable product concepts. Identify the parts differentiation matrix. Produce visual prototype, functional prototype, clear market definition. ***Stage 4 - Realizing the opportunity*** Develop a clear marketing plan, taking account of the interests of stakeholders. Consider intellectual property protection. Consider materials and manufacturing process.
Teaching/Learning Methodology	This syllabus has evolved over three years of application as a core subject in the BA Hons Design. It is now a very successful component of this degree because the delivery of the syllabus is concurrent with an individual design project. This syllabus provides a powerful framework for new product development that is proposed by Professors Cagan and Vogel of Carnegie Mellon University. The framework described in their 2002 book *Creating Breakthrough Products: Innovation from Product Planning to Program Approval* (Prentice Hall) is the reference textbook for this syllabus. Professor Vogel is a visiting faculty in the School of Design which will enable us to maintain close links with the continuing refinement of this new product development framework.

The pattern of lectures, seminars and tutorials shifts from a general approach of establishing an understanding of the framework for innovative product development which is established in the lectures, to a more specified application of the concepts which is progressed in seminars and tutorials. This approach to the syllabus enables a close integration between this syllabus and the Capstone Project.

Major Teaching/Learning Activities:

Weeks 1 – 7 Lectures and seminars in which the conceptual framework is explained to students, and they begin to apply it to the early stages of the capstone project
Week 7 Hand in progress report
Week 8 Self study
Week 9 Review of progress reports
Weeks 10-12 Tutorials on the production of final reports
Week 12 Hand in final report
Week 13 Review of final reports

Assessment Methods in Alignment with Intended Learning Outcomes

Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					
		a	b	c	d	e	
1.Progress report	30	V	V	V	V		
2. Final report	60	V	V	V	V	V	
3. Contribution to class activities	10					V	
Total	100 %						

Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:

The participation in the co-requisite Capstone Project is based on groups of 3 students. It is desirable that all 3 students should elect to undertake this subject. In this case the presentations, Progress Report and Final Report are produced by the same group of 3 students.

In the event of only one or two members of a Capstone Project group electing to undertake this subject, their input to the Project is expected to be enhanced and enable them to take a leading role in the development of the Project.

The *Progress Report* (30% of assessment) should demonstrate how the concepts learned in this syllabus inform the Capstone Project The concepts relating to the development of breakthrough products/services should

<table>
<tr><td></td><td colspan="2">strengthen the project proposal(s) of the Capstone Project by providing useful frameworks for developing new product ideas. The Progress Report should be about 2,000 words of explanation in addition to images, figures and other visual contributions. It is a draft of the Final Report that is to be handed in at the end of the semester.

The Final Report (60% of assessment) is to be handed in for grading in week 12. This report should provide a basis for the project report(s) of the Capstone Project. It will be a more developed version of the Progress Report. The structure of the report should reflect the choices made from the key concepts discussed in this syllabus, and should contain about 3,000 words of explanation in addition to images, figures and other visual contributions.

Contribution to class activities (10% assessment).

The assessed activities – the Progress and Final reports, are closely linked with progress in the Capstone Project. The Progress Report is both formative and summative. This approach supports deep engagement in the learning materials.</td></tr>
<tr><td rowspan="7">Student Study Effort Required</td><td>Class contact:</td><td></td></tr>
<tr><td>▪ Lecture</td><td>26 Hrs.</td></tr>
<tr><td>▪ Seminar and tutorial</td><td>13 Hrs.</td></tr>
<tr><td>Other student study effort:</td><td></td></tr>
<tr><td>▪ Research and self study</td><td>13 Hrs.</td></tr>
<tr><td>▪ Preparation of report</td><td>28 Hrs.</td></tr>
<tr><td>Total student study effort</td><td>80 Hrs.</td></tr>
<tr><td>Reading List and References</td><td colspan="2">1. Design Management Journal, Design Management Institute. Various editions.
2. Bruce, M & W.G. Biemans, 1995, Product Development: Meeting the Challenge of the Design-Marketing Interface. John Wiley.
3. Bruce, M. & J. Bessant, (eds.) 2002, Design in Business: Strategic Innovation Through Design. Pearson Education.
4. Cagan J. & C.M. Vogel, 2002, Creating Breakthrough Products: Innovation from Product Planning to Program Approval. Prentice Hall.
5. Conny, B., 2014, Products that Last: Product Design for Circular Business models. TU Delft Library.
6. Gilmore, F. & S. Dumont, 2003, Brand Warriors China: Creating Sustainable Capital. Profile Books.
7. Monika, H, 2013, Branding and Product Design: An Integrated Perspective. Gower Publishing.
8. Rosner, K. M., 2012, Packaging design successful product branding from concept to shelf (2nd ed.). Wiley.
9. Shan, P., 2011, How to Run a Successful Design Business the New Professional Practice. Gower.</td></tr>
</table>

Product Design

SD4463 Sustainable Product Design

Discipline Elective

Level	4
Credit value	3
Contact hours	39

Pre-requisites
Nil

Co-requisites
Nil

Exclusions
Nil

Objectives

This subject aims to enable students to explore and practice product design via a sustainable solution approach, and introduce them with system design thinking. Students will learn to develop products from a broader social and ecological context. Through seminars and group tutorials, students will also be introduced to the concepts of design for environment (DfE), design for sustainability (DfS), system-product design (SpD) and basic sustainable product design strategies.

Intended learning outcomes

Upon completing the subject, students will be able to:

Professional skills

1. recognise the significance of solution-based design and system design thinking in the practice of industrial design;
2. critically analyze a given design problem or a model sustainable solution;
3. formulate eco-design strategies based on the given problem or sustainable solution;
4. produce an eco-friendly design via lifecycle thinking and appropriate eco-design strategy;
5. practice visualization, 3D modeling, product's form and material selection in design production.

Transferable skills

6. Social/cultural appreciation, critical and creative thinking, leadership and entrepreneurship.
7. System thinking, project management and presentation skills.

Subject synopsis

Students will be introduced to:

Design for Environment (DfE)

- notion of 'sustainability';
- basic idea of eco-design/Design for Environment (DfE);
- concept of lifecycle thinking;
- 4 DfD strategies;

Design for Sustainability (DfS)

- the '4r' and '4R';
- function-based/solution-based design;
- concept of 'Design for Sustainability' (DfS);
- idea of 'system' and the concept of 'system design' thinking;
- basic concept of Product-Service System (PSS) & System-product Design (SpD).

Teaching and learning methods

Activity	Purpose
Lecture	To introduce students to theories and principles related to the topic.
Workshop	Putting principles into practice with short in-class exercises
Seminar	To discuss assigned readings related to the topic, expanding students' contextual knowledge
Tutorial	To guide students on the development of projects, individually and in small groups
Critique	To allow students to learn from the strengths and weaknesses of their peers and to provide a framework for evaluating the effectiveness of the students' projects from various perspectives

Assessment methods

			Learning outcomes to be assessed						
	Assessment task	Weighting	1	2	3	4	5	6	7
1	Workshop 1: LCA	20%	•	•	•	•	•		
2	Workshop 2: mental modeling	20%		•	•	•	•		
3	Design Project	60%			•	•	•	•	•
	Total	100%							

Purposes
The ability to recognize the essential idea of life-cycle thinking
The ability to analysis the environmental quality of a given product with simplified LCA tool
The ability to analyze a given problem or a sample solution in systematical and critically
The ability to apply the learning of solution-based and system design thinking in the process of design
The ability to apply knowledge of lifecycle thinking and to formulate appropriate eco-design strategy
The ability to make appropriate choices of materials, process and product form and capable to visualize design in professional drawings and 3D mod in the process of design
The ability to produce appropriate/ creative design and manage design process in a professional manner

Student study effort expected

		hours
	Class contact	
1	Lecture	10
2	Group Tutorial	18
3	Workshop	11
	Other student study effort	
1	Self-study	21
2	Project work	45
	Total student study effort	105

References

Books

Leong, B.D., & Manzini, E. (2006). Design vision: The sustainable way of living in China. Guangzhou, China: Lingnan Art Publishing.

Martin Charter & Ursula Tischner (2001). Sustainable solutions: Developing products & services for the future. UK: Greenleaf Publishing.

W. McDonough & M. Braungart (2002). Cradle to cradle: Remaking the way we make things. New York: North Point Press.

Papanek, Victor (1995). The green imperative. New York: Thames and Hudson.

Helen Lewis & John Gertsakis (2001). Design + environment: A global guide to designing greener goods. UK: Greenleaf Publishing.

Alastair Fuad-Luke (2002). Eco-design: The sourcebook. San Francisco: Chronicle Books.

Internet references/web sites

O2 Global Net. http://www.o2.org

Centre of Sustainable Design. http://www.cfsd.org.uk

Eco-concept. www.econcept.org

SECTION 9 – INDUSTRIAL CENTRE TRAINING MODULES

The IC Training modules for the programme are listed below. Note that this list is not exhaustive and other modules may be developed to replace or supplement those listed. Such alterations are on-going and will be made in conjunction with the Departmental Undergraduate Programme Committee's assessment of current needs in conjunction with the Industrial Centre.

TABLE 9 - INDEX

Subject Code	ISE2105/IC2105
Subject Title	Engineering Communication and Fundamentals
Credit Value	4 Training Credits
Level	2
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject offers a wide spectrum of fundamental engineering practice that are essential for a professional engineer. This subject includes Engineering Drawing and CAD, Safety, Basic Mechatronic Practice, Mechanism Design Practice and Scientific Computing Languages that aims at providing fundamental and necessary technical skills to all year 1 students interested in engineering.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Describe the principles and conventional representation of engineering drawings according to engineering standards and be able to use it as a medium in technical communication and documentation with CAD application, modelling and practice with application in engineering; b) Interpret basic occupational health and industrial safety requirements for engineering practice; c) Explain common testing requirements; d) Apply scientific computing software for computing in science and engineering including visualization and programming. Upon completion of Stream A of the subject, student will be also able to: e) Design and implement simple mechatronic systems with programmable controller, software, actuation devices, sensing devices and mechanism. Upon completion of Stream B of the subject, student will be also able to: f) Design and fabricate simple mechanism assembly with standard components, fast prototyping processes and tolerance practices.

Subject Synopsis/ Indicative Syllabus	1 (TM2009) Industrial Safety 1.1 Safety Management Overview, essential elements of safety management, safety training, accident management, and emergency procedures. 1.2 Safety Law F&IU Ordinance and principal regulations, OSH Ordinance and principal regulations. 1.3 Occupational Hygiene and Environmental Safety Noise hazard and control; dust hazard and control; ergonomics of manual handling. 1.4 Safety Technology Mechanical lifting, fire prevention, dangerous substances and chemical safety, machinery hazards and guarding, electrical safety, first aid, job safety analysis, fault tree analysis, and personal protective equipment. 2 (TM1340) Dimensioning and Tolerancing Practice 2.1 Measurement Principles of engineering drawing and orthographic projection; basic concept of dimensioning and tolerancing; introduction to common measuring tools and measurement practices such as steel rule, vernier calipers, micrometer, height gauge, optical projector and coordinate measuring machine (CMM). 2.2 Fitting Practice and Assembly Introduction to fasteners; introduction of hand tools and fitting practices such as filing, drilling, sawing, tapping and threading; assembly practice with fasteners and torque wrenches. 3 (TM8060) Computer Aided Design Fundamental 3.1 General concepts on CAD Parametric feature-based solid modelling; construction and detailing of solid features; solid model modification and its limitations. 3.2 Assembly modelling Bottom-up and top-down approaches for the generation of parts, subassemblies, and final assembly; mechanism design and its simulation methods. 3.3 Generation of engineering drawing Types of drawings including part drawing and assembly drawing; generation of 2D drawings from 3D parts and assemblies; drawing annotation. **One of the following as decided by hosting programme** Stream A 4a (TM3019) MATLAB for Engineers and Scientists 4.1 Introduction of MATLAB Interactive calculations, random number generators, variables, vectors, matrices and string; mathematical operations, polynomial operation, data analysis and curve fitting, file I/O functions. 4.2 Problems solving with MATLAB Basic plotting, formatting graph, 2D and 3D plots, annotations, contour, mesh and surface plots, colormap. M-file programming & debugging;

	scripts, functions, logic operations, flow control and graphic user interfaces. 4.3 Basic data analysis and simulation Basic simulation using common functions for numerical integration and differentiations. Use of Simulink in the control of robotic systsms. Basic data analysis using common functions for filtering and spectral analysis. 5a (TM0512) Mechatronics Practice for Engineers 5.1 Overview of Mechatronics; Programmable Logic Controller (PLC); microcontroller systems; control systems (e.g. open loop, close loop, sequential) for monitoring and controlling mechatronic systems. 5.2 Sensor technologies used in mechatronic systems; computer vision and its application in robots/AI robots. 5.3 Typical mechanical power transmission systems; electromechanical devices (e.g. motors, solenoids); actuators with mechanical motion. Stream B 4b (TM3302) Python for Engineers and Scientists 4.1 Fundamental of Python Basic data type; variable and identifiers; constant, statement and expression, control structure and logic, string, tuple and list, set; object oriented concepts; interactive calculations and mathematical operations. 4.2 Problems solving with Python Functions and Python packages to solve engineering problem (i.e. plot displacement diagram). 4.3 Human Machine Interface (HMI) Application development with data manipulation, visualisation and HMI by using data and graphics packages such as data processing, data plotting, visualisation, exploratory data analysis and graphic user interface. 5b (TM1325) Fast prototyping for mechanism design 5.1 Overview of basic mechanisms Basic principle of mechanical advantage mechanism; (e.g. gear, wheel and axle, linkages, pully, lever). 5.2 Fast prototyping techniques Basic principle and operations of 3D printing, FDM, SLA, DLP, pre-processing technique, part orientation, support structure, slicing, infill density, determination of different processing parameters for different applications, (e.g. light weight, heavily duty). laser machining & engraving operation techniques with its CAD preparation; basic 3D scanning operation; simulation of gear assembly and 4-bar linkage movement. 5.3 Performance evaluation of mechanism assembly Mechanism assembly by means of standard components, (e.g. gear, bolt and nuts, spacers) with Arduino motor control; performance evaluation; force and speed measurement; measurement of material properties.

Learning Methodology	The learning and teaching methods include lectures, workshop tutorials, and practical works. The lectures are aimed at providing students with an overall and concrete background knowledge required for understanding key issues in engineering communication, use of standard engineering components and systems, and importance of industrial safety. The workshop tutorials are aimed at enhancing students' in-depth knowledge and ability in applying the knowledge and skills to complete specific tasks. The practical works aim at facilitating students to review the diverse topics covered in this course and perform active learning with research, practice, questioning, and problem solving in a unified activity.

Assessment Methods in Alignment with Intended Learning Outcomes

The assessment methods and weighting for Stream A and Stream B are same.

Assessment Methods	Remarks
1. Assignment	Individual in class hand-on practice assignment is designed to facilitate students to reflect and apply the knowledge periodically throughout the training.
2. Test	Test is designed to facilitate students to review the breadth and depth of their understanding on specific topics.
3. In-class learning logs	In-class learning log is designed to facilitate students to review their learning achievement and critize the outcomes by self-reflection.

Remark: ILO "e" and "f" will be assessed according to the Stream option, e.g. Stream A for "e" and Stream B for "f"

Assessment Methods	Weighting (%)	Intended Learning Outcomes Assessed					
		a	b	c	d	e	f
Continuous Assessment							
1. Assignment/Project	77.5	✓	✓	✓	✓	✓	✓
2. Test	15		✓		✓		
3. In-class learning logs	7.5					*✓	*✓
Total	100						

Student Study Effort Expected	**Class Contact (Stream A)**	**TM8060**	**TM2009**	**TM1340**	**TM0512**	**TM3019**
	▪ Short lecture	7 Hrs.	7 Hrs.	3 Hrs.	7 Hrs.	7 Hrs.
	▪ In-class Assignment/ Hands-on Practice	23 Hrs.	8 Hrs.	12 Hrs.	23 Hrs.	23 Hrs.
	(Stream B)	**TM8060**	**TM2009**	**TM1340**	**TM1325**	**TM3302**
	• Short lecture	7 Hrs.	7 Hrs.	3 Hrs.	7 Hrs.	7 Hrs.
	• In-class Assignment/ Hands-on Practice	23 Hrs.	8 Hrs.	12 Hrs.	23 Hrs.	23 Hrs.
	Other Study Effort					
	▪ Nil					
	Total Study Effort					**120 Hrs.**
Reading List and References	**Reference Software List:** 1. AutoCAD from Autodesk Inc. 2. SolidWorks from Dassault Systèmes Solidworks Corp. 3. MATLAB from The Mathworks Inc. 4. Python from Python Software Foundation **Reference Standards and Handbooks:** 1. BS EN ISO 128 – Technical product documentation. General principles of representation 2. Cecil H. Jensen, et al, Engineering Drawing and Design, McGraw-Hill, 2008. 3. IEEE Standard 315 / ANSI Y32.2 / CSA Z99 Graphic Symbols for Electrical and Electronics Diagrams. 4. IEC 61082 Preparation of Documents used in Electrotechnology. **Reference Books:** Training material, manual and articles published by Industrial Centre.					

Subject Description Form

Subject Code	ISE2121
Subject Title	Appreciation of Manufacturing Technologies
Credit Value	3 Training Credits
Level	2
Pre-requisite/ Co-requisite/ Exclusion	ISE2105 or IC2105
Objectives	This subject aims at developing student's knowledge on technologies applied in the product development workflow through an integrated application-oriented learning. The practical use of principles and operation of different manufacturing processes, and properties and application of common materials will be involved for mechanism design. It can enhance student's recognition of the working principle, process capability (e.g. accuracy, limitations) and application in order to strengthen students' engineering competence.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) identify working principle and capability of different manufacturing technologies. b) justify appropriate manufacturing processes for specific parts and product requirements. c) collaboratively execute mechatronics tasks with basic mechanism design and engineering control.
Subject Synopsis/ Indicative Syllabus	The extent of the training will depend on the nature of the product that students work on, not all listed activities are likely to be undertaken for all tasks. 1. Application and Selection of Engineering Materials 2. Application and Selection of Mechanism 3. Application and Operation of ▪ Common Manufacturing Processes for Metal Parts ▪ Common Manufacturing Processes for Plastic Parts ▪ Common Manufacturing Processes for PCBA ▪ Processes for Surface Treatment ▪ Operation of Common Joining Processes ▪ Operation of Computer-Aided Systems ▪ Rapid Prototyping and Production Technologies ▪ Manufacturing Metrology ▪ Reverse Engineering ▪ Composites Fabrication

<table>
<tr><td>Learning Methodology</td><td>Mini lectures introduce the principle of different manufacturing processes and their applications.

Demonstrations provide students with understanding on the operation procedures of processes involved in the training

Hands-on activities will be used for students to apply the working principles in the training.</td></tr>
<tr><td>Assessment Methods in Alignment with Intended Learning Outcomes</td><td>
<table>
<tr><th rowspan="2">Specific Assessment Methods/Tasks</th><th rowspan="2">Weighting (%)</th><th colspan="3">Intended Learning Outcomes to be assessed</th></tr>
<tr><th>a</th><th>b</th><th>c</th></tr>
<tr><td>1. Individual Assignments</td><td>60</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>2. Product Assembly</td><td>10</td><td></td><td></td><td>✓</td></tr>
<tr><td>3. Individual Report</td><td>30</td><td>✓</td><td>✓</td><td></td></tr>
<tr><td>Total</td><td>100</td><td colspan="3"></td></tr>
</table>
Individual Assignments are designed to facilitate students to reflect and apply the knowledge periodically throughout the class.

Product Assembly is designed to facilitate students to show their group performances, collaboration and problem-solving capability.

Written report is designed to facilitate students to show the recognition and their reflection to the training.</td></tr>
<tr><td>Student Study Effort Expected</td><td>
<table>
<tr><td colspan="2">Class Contact</td></tr>
<tr><td>▪ Mini lecture, Demonstrations and Hands-on practices</td><td>90 Hrs.</td></tr>
<tr><td>Other Student Study Effort</td><td>0 Hrs.</td></tr>
<tr><td>Total Student Study Effort</td><td>90 Hrs.</td></tr>
</table>
</td></tr>
<tr><td>Reading List and References</td><td>A. Interpreting Engineering Drawings, Cecil Jensen, Delmar Cengage Learning, 2006
B. Fundamental of machining processes: Conventional and nonconventional processes, Hassan El Hofy, CRC, 2006
C. Reading Materials published by the Industrial Centre</td></tr>
</table>

Subject Description Form

Subject Code	ISE3103
Subject Title	Integrated Project
Credit Value	3 Training Credits
Level	3
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	This subject aims to provide students hands-on engineering-business project experience. In real industrial situations, all projects are related to both engineering and business; such as design feasibility and market opportunity. Engineers are expected having the skills of working in interdisciplinary teams on multidisciplinary projects. In this subject, students have to work in a team with members from other disciplines on an engineering-business project which students may practice and integrate their learned theories and knowledge from academic subjects in their programmes.
Intended Learning Outcomes	Upon completion of the subject, students will be able to: a) Describe the benefits from experience in working within an interdisciplinary team on a multidisciplinary project of both engineering and business. *(Objective 1 and Syllabus Item 1-4). Category A* b) Formulate solutions for different stages of a multidisciplinary project such as project planning, market research, design & packaging, CAD & prototyping, technology investigation, inventory & distribution management, and business proposal & presentation. *(Objective 1 and Syllabus Item 1-4). Category A* c) Integrate knowledge developed over the course of their field of study to achieve the objectives of the project by producing the deliverables *(Objective 1 and Syllabus Item 1-4). Category A* d) Manifest their work effectiveness in multidisciplinary and multilateral teams, and demonstrate tolerance and awareness of other viewpoints *(Objective 1 and Syllabus Item 1-4). Category B* e) Collaboratively execute an application oriented project through group work and discussions and inspires oneself to learn continuously about current industrial technologies *(Objective 1 and Syllabus Item 1-4). Category B*.

Subject Synopsis/ Indicative Syllabus	The extent of the project will depend on the nature of the project that students work on, not all listed activities are likely to be undertaken for all projects. 1. Project Planning Scheduling of Market Research, Design, Prototype, Technology Audit, Inventory and Distribution Management, and Business Proposal. Allocation of resources of Manpower, Machines, and Money. 2. Market Research Start with collecting information in market in the view of the given project theme. Then analyze the potential market, estimate the market opportunity, and identify the market niche, 3. Design Activity Iterative design processes to evaluate & make concept decisions for the theme product and also packaging; document and communicate the concept information to designer, engineers, and marketing people. 4. Prototype Development Build a prototype with the facilities in the centre such as CAD, RP, CAM, Laser Machining, Basic Electronic Control and IOT sensors and devices to evaluate, demonstrate, and present the design concepts as well as functionality. 5. Technology Investigation Investigate the existing technologies and equipment in the centre. Evaluate the cost and performance of different manufacturing processes. Study the feasibility of manufacturing of the product. 6. Inventory & Distribution Management Estimate the production volume and the inventory control level, or if necessary as well as the warehouse management. Propose the wholesale and retail distribution channels. 7. Business Proposal and Presentation Present a business proposal with consolidating the findings from Market Research to Distribution Management. Summarize the pricing strategy, cost, resources, volume, time and prediction of the profit.
Learning Methodology	All projects assigned will be of 'real' work basis proposed by supervisors. Typical projects are product for a specific application, material handling systems, testing jig and fixture…etc. These projects are always having a real problem of serious interest to the clients which requires students to meet the expected demand.

Assessment Methods in Alignment with Intended Learning Outcomes

Assessment Methods	Weighting (%)	Intended Learning Outcomes Assessed				
		a	b	c	d	e
4. In-class Assignment	30	✓	✓	✓		✓
5. Project Performance	30	✓	✓	✓	✓	
6. Oral Presentation	20	✓	✓		✓	
7. Written Report	20			✓	✓	✓
Total	100					

The In-class assignment is aimed at assessing student's individual performance and practical ability in the project works.

The Project Performance is evaluated according to the deliverables in different stages during the project. It consists both "group" and "individual" works to reflect the overall group performance and individual student's contribution.

Oral Presentation allows students presenting their project clearly and logically including the project objectives, approaches, and deliverables. It consists both "group" and "individual" works to reflect the overall group performance and individual student's contribution.

Written Report is to facilitate students to sum up the project holistically. The assessment will focus on the discussion and reflection. It consists both "group" and "individual" works to reflect the overall group performance and individual student's contribution.

Student Study Effort Required

Class Contact	
▪ Practical appreciation and Group Project	90 Hrs.
Total Study Effort	**90 Hrs.**

Reading List and References

Training material, manual and articles published by Industrial Centre.

Appendix I

GENERAL UNIVERSITY REQUIREMENTS FOR NORMAL STUDENTS

General University Requirements (GUR)

(a)	Language and Communication Requirements	9 credits
(b)	GUR - AIDA	2 credits
(c)	GUR - IE	1 credit
(d)	Leadership Education and Development	3 credits
(e)	Service-Learning	3 credits
(f)	Cluster Areas Requirements (CAR)	12 credits
(g)	Healthy Lifestyle	Non-credit bearing
		Total = 30 credits

(a) Language and Communication Requirements (LCR)

English

All undergraduate students must successfully complete two 3-credit English language subjects as stipulated by the University, according to their English language proficiency level (**Table A**). These subjects are designed to suit students' different levels of English language proficiency at entry, as determined by their HKDSE score or the English Language Centre (ELC) entry assessment (when no HKDSE score is available, e.g. in the case of non-local students).

Students entering the University with specified attainment grades in certain public examinations can be given credit transfer or exemption for one or both LCR English subjects. Please refer to the following link for details on English LCR credit transfer and exemption arrangement:
https://www.polyu.edu.hk/ous/docdrive/_sso/Staff/Guidelines_for_Credit_Transfer_on_General_University_Requirements_Subjects.pdf

Table A: English LCR subjects (each 3 credits)

English language competence level	***Practical English for University Studies (ELC1011)***	***English for University Studies (ELC1012/1013)***	**Any LCR Proficient level elective subject in English (Table B)**
HKDSE Level 4 and above or equivalent	--	Subject 1	Subject 2
HKDSE Level 3 or equivalent	Subject 1	Subject 2	--

Table B: Proficient level elective subjects for DSE Level 4 students and above (or equivalent) (each 3 credits)

LCR Proficient level elective subjects	*Advanced English Reading and Writing Skills (ELC2011)*
	Persuasive Communication (ELC2012)
	English in Literature and Film (ELC2013)
	Advanced English for University Studies (ELC2014)

Chinese

All undergraduate students are required to successfully complete one 3-credit Chinese language subject as stipulated by the University, according to their Chinese language proficiency level (**Table C**).

Table C: Chinese LCR subjects

Categories of students	Required subject
For Chinese speaking students	University Chinese (Cantonese or Putonghua version) 3 credits CLC1104C (Cantonese version) CLC1104P (Putonghua version)
For non-Chinese speakers or students whose Chinese standards are at junior secondary level or below	One subject from **Table D** below

Table D: Chinese LCR subjects for non-Chinese speakers or students whose Chinese standards are at junior secondary level or below

Subject (3 credits)	**Pre-requisite/exclusion**
Chinese I (for non-Chinese speaking students) CLC1151	• For non-Chinese speaking students at beginners' level
Chinese II (for non-Chinese speaking students) CLC1152	• For non-Chinese speaking students; and • Students who have completed Chinese I or equivalent
Chinese III (for non-Chinese speaking students) CLC2151	• For non-Chinese speaking students at higher competence levels; and • Students who have completed Chinese II or equivalent
Chinese IV (for non-Chinese speaking students) CLC2154	• For non-Chinese students at intermediate competence levels; and • Students who have completed Chinese III or equivalent
Chinese Literature – Linguistic and Cultural Perspectives (for non-Chinese speaking students) CLC2152	• For non-Chinese speaking students at higher competence levels

Students who have obtained verified qualifications or certain results in some public examinations [e.g. HKDSE, HKALE, JEE, GSAT(Taiwan)] may be granted credit transfer or exemption for the Chinese LCR subject. Please refer to the following link for details on Chinese LCR credit transfer and exemption arrangements:
https://www.polyu.edu.hk/ous/docdrive/_sso/Staff/Guidelines_for_Credit_Transfer_on_General_University_Requirements_Subjects.pdf

Writing Requirement

In additional to the LCR in English and Chinese explained above, all students must also, among the Cluster Areas Requirement (CAR) subjects they take (see section (f) below), pass one subject that includes a requirement for a substantial piece of writing in English and one subject with a requirement for a substantial piece of writing in Chinese.

Reading Requirement

All students must, among the CAR subjects they take, pass one subject that includes the requirement for a reading of an extensive text in English and one subject with a requirement for the reading of an extensive text in Chinese.

A list of approved CAR subjects for meeting the Writing Requirement (with a "W" designation) and Reading Requirement (with an "R" designation) is shown at:
https://www.polyu.edu.hk/ous/GURSubjects/

Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from DSR – Chinese and CAR – Chinese Reading and Writing requirements. However, this group of students would still be required to take one Chinese LCR subject to fulfil their Chinese LCR.

Note: In addition to the LCR and Reading and Writing Requirements, students must also complete 4 credits of discipline-specific language requirements (2 credits in English and 2 credits in Chinese) as specified in the curriculum requirements of their Major.

(b) Artificial Intelligence and Data Analytics (AIDA)

All students must successfully complete one 2-credit subject in the area of Artificial Intelligence and Data Analytics, which is designed to (i) demonstrate an understanding of the foundational concepts of Artificial Intelligence and Data Analytics (AIDA); (ii) acquire basic skills in using AIDA technologies and applications; (iii) articulate examples of how the adoption AIDA could enhance their chosen disciplines; and (iv) demonstrate an awareness of global contemporary ethical issues and impact from AIDA applications in daily life.

These subjects may take the form of:

- An open-for-all GUR-AIDA subject
- GUR-AIDA subject targeting a particular student group (e.g. a programme).

A list of designated subjects for meeting the GUR-AIDA requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

(c) Innovation and Entrepreneurship (IE)

All students must successfully complete one 1-credit subject in the area of Innovation and Entrepreneurship, which is designed to (i) demonstrate an elementary understanding of innovation and entrepreneurship; (ii) appreciate the importance of innovation and entrepreneurship in local and global community; (iii) appreciate the applications and implications of the latest technologies on entrepreneurship and innovation in their chosen disciplines; and (iv) identify ethical issues in entrepreneurship and innovation.

These subjects may take the form of:

- An open-for-all GUR-IE subject
- GUR-IE subject targeting a particular student group (e.g. a programme).

A list of designated subjects for meeting the GUR-IE requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

(d) Leadership Education and Development (LEAD)

All students must successfully complete one 3-credit subject in the area of Leadership Education and Development, which is designed to enable students to (i) understand and

integrate theories, research, and concepts on the basic qualities (particularly intrapersonal and interpersonal qualities including law abidance) of effective leaders, (ii) develop self-awareness and self-understanding, (iii) demonstrate self-leadership in pursuit of continual self-improvement, (iv) apply intrapersonal and interpersonal skills in daily lives, (v) appreciate the importance of intrapersonal and interpersonal qualities in effective leadership, particularly the connection of learning in the subject to one's professional development and personal growth, and (vi) recognise and accept their social responsibility as professionals and citizens to the society and the world.

A list of designated subjects for meeting the leadership education and development requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

(e) Service-Learning

All students must successfully complete one 3-credit subject designated to meet the Service-Learning Requirement, in which they are required to (1) participate in substantial community service or civic engagement activities that will benefit the service users or the community at large in a meaningful way, (2) apply the knowledge and skills acquired from their Major or other learning experiences at the University to the community service activities, and (3) reflect on their service learning experience in order to link theory with practice for the development of a stronger sense of ethical, social and national responsibility.

These subjects may take the form of:

- An open-to-all GUR service-learning subject
- A GUR service-learning subject targeted for a particular student group (e.g. a Broad Discipline), or
- A customised DSR subject (core or elective) within the Major/Minor with all the required features and components to meet the Service-Learning Requirement.

Students who have satisfied the Service-Learning Requirement via a customised DSR subject will be required to take another 3-credit subject to make up for the total credit requirement.

A list of designated subjects for meeting the service-learning requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

(f) Cluster Areas Requirement (CAR)

To expand students' intellectual capacity beyond their disciplinary domain and to enable them to tackle professional and global issues from a multidisciplinary perspective, students are required to successfully complete at least one 3-credit subject in each of the following four Cluster Areas:

- Human Nature, Relations and Development
- Science, Technology and Environment
- Chinese History and Culture
- Cultures, Organizations, Societies and Globalization

A list of CAR subjects under each of the four Cluster Areas is available at: https://www.polyu.edu.hk/ous/GURSubjects/

(g) Healthy Lifestyle

Healthy lifestyle is the platform for all-round development. Students are required to successfully complete a non-credit-bearing programme in healthy lifestyle.

Students are required to complete the following components: (i) sports training/participation, (ii) e-learning modules, and (iii) lectures/talks. The syllabus covers physical health, mental health, social health, spiritual health, values and priorities on health behaviour with reference to competing priorities in life, reflection on healthy living and plans for self-improvement or maintenance of health behaviour. Details of the programme can be found at: https://www.polyu.edu.hk/ous/GURSubjects/HLS.php

Students in UGC-funded articulation degree programmes and Senior Year intakes to the 4-year Ug degree programmes are not required to take the Healthy Lifestyle (HLS) Programme. Advanced Standing students are required to take HLS (with the exception of those who are AD/HD holders following the Senior Year/Articulation Degree programme GUR curriculum).

Appendix II

GENERAL UNIVERSITY REQUIREMENTS FOR SENIOR YEAR STUDENTS

General University Requirements (GUR)

(a)	Cluster Areas Requirement (CAR) [3 credits from CAR(A)^ and 3 credits from CAR(M)]	6 credits
(b)	Service-Learning	3 credits
(c)	Essential Components of General Education	Non-credit-bearing
		Total = 9 credits

^Students are required to take a specially designed CAR(A) – English Language Subject with embedded English Reading and Writing Requirements.

(a) Language and Communication Requirements (LCR)

Those students not meeting the equivalent standard of the Undergraduate Degree LCR (based on their previous studies in AD/HD programme and academic performance) will be required to take degree LCR subjects on top of the normal curriculum requirement. The programme offering department will refer to the guidelines provided by the Language Centres (ELC and CLC) to determine whether a new student has met the equivalent standard. Non-Chinese speakers and those students whose Chinese standards are at junior secondary level or below will by default be exempted from the DSR - Chinese and CAR - Chinese Reading and Writing requirements. However, this group of students would still be required to take one Chinese LCR subject to fulfil their Chinese LCR.

Degree LCR subjects include

<u>TWO English language subjects</u>

- Practical English for University Studies (ELC1011) 3 credits
- English for University Studies (ELC1012/1013) 3 credits
- Advanced English for University Studies (ELC2014) 3 credits

<u>ONE Chinese language subject</u>

- University Chinese (CLC1104C/P) 3 credits

(b) Cluster Areas Requirement (CAR)

- 3 credits from CAR(M) Chinese History and Culture.
- A specially-designed CAR (A) – English language subject with embedded English Reading and Writing Requirements, which should be completed within the first year.
- Students should not take more than 3 credits (normally 1 subject) from the same cluster area.
- Students need to fulfil the English and Chinese Reading and Writing Requirements.
- Students may apply for a waiver if they have fulfilled the English and Chinese Reading and Writing requirements in their previous studies.

(c) Service-Learning

All students must successfully complete <u>one</u> 3-credit subject designated to meet the Service-Learning Requirement, in which they are required to (1) participate in substantial community service or civic engagement activities that will benefit the service users or the community at large in a meaningful way, (2) apply the knowledge and skills acquired from their Major or other learning experiences at the University to the community service activities, and (3) reflect on their service learning experience in order to link theory with practice for the development of a stronger sense of ethical, social and national responsibility.

These subjects may take the form of:

- An open-to-all GUR service-learning subject

- A GUR service-learning subject targeted for a particular student group (e.g. a Broad Discipline), or
- A customised DSR subject (core or elective) within the Major/Minor with all the required features and components to meet the Service-Learning Requirement.

Students who have satisfied the Service-Learning Requirement via a customised DSR subject will be required to take another 3-credit subject to make up for the total credit requirement.

A list of designated subjects for meeting the service-learning requirement is available at: https://www.polyu.edu.hk/ous/GURSubjects/

(d) Essential Components of General Education

To allow Senior Year Intakes and articulation Degree Programmes students to acquire the basic knowledge of the following e-modules:

- Academic Integrity
- Artificial Intelligence and Data Analytics
- Innovation and Entrepreneurship
- National Education

BENG (HONS) IN PRODUCT ENGINEERING (PE) WITH A SECONDARY MAJOR IN INNOVATION AND ENTREPRENEURSHIP (IE)

(a) Rationale and Aims of PE award

Product Engineering (PE) is concerned with the studies of product conception and specifications, technical design, design for product lifecycle, prototyping, materials and manufacturing processes, mould and die design, process design, quality assurance as well as outsourcing and their implications to a new product to be developed in terms of time-to-market, cost, environmental friendliness and quality. The PE major provides students with integrated education at honours degree level to enable them to develop into competent professionals in new product development. On completion of the PE major, students are expected to:

1. have knowledge and understanding needed to perform duties of product development;
2. demonstrate the ability to identify and solve product engineering problems both as individuals and as members of teams;
3. have been exposed to a range of academic activities of such style and content as will enable them to develop effective communication skills (oral, written, graphical and numerate);
4. have an awareness of professional ethics and social responsibilities to the community at large;
5. have been exposed to a range of activities that will enable them to seek, learn and apply information that is pertinent to the work they are undertaking.

(b) Intended Learning Outcomes of PE award

The attributes of graduates produced by this programme, as listed below, are aligned with the programme aims specified in above, as well as the HKIE programme outcomes.

1. To be versed in the activities of various engineering disciplines, and in particular, product engineering so as to be able to appreciate and interact with other professionals during execution of their duties.
2. To be able to apply knowledge, procedures (principles, techniques and methods), of engineering and, where appropriate, mathematics and science, to solve product engineering problems, and to have sufficient understanding of their limitations so that they can select the most appropriate for a particular situation.
3. To have gained some experience and developed the ability in identifying market needs and converting them into a new product.
4. To be able to communicate (oral, written, graphical and numerate) effectively.
5. To be able to effectively work individually on their own initiative, and as members of a team.
6. To be aware of the responsibilities and ethics of professional engineers in the modern world and recognise the constraints imposed on the organisations by economic and environmental factors.
7. To possess the ability to engage in life-long learning.

(c) Rationale and Aims of IE award

This Secondary Major curriculum takes a cross-disciplinary approach that aims to instil in students from different disciplines the spirit and mindset of innovation and entrepreneurship, whether it is applied to the commercialisation of technologies specifically or to problem-solving in general. Through the cross-disciplinary design, students are equipped with knowledge and techniques critical to the analysing, planning, and implementing of financially-viable and technically-feasible innovation and entrepreneurship. Students are provided with hands-on experience in innovative and entrepreneurial activities.

(d) Intended Learning Outcomes of IE award

Upon completion of this secondary major, students are expected to be able to:

1. Develop an innovative and entrepreneurial mindset in exploring a business solution
2. Critically assess business environments, as well as identify opportunities and innovative ideas with the support of professional-specific skills and knowledge
3. Demonstrate an understanding on the applications and implications of the latest technologies to inform or support entrepreneurship and innovation
4. Align the resources and interests of different stakeholders in the knowledge transfer process through effective communication
5. Identify and respond appropriately to ethical issues as they arise in different business settings

1.

(e) Selection Mechanism

Studying a Secondary Major is a free choice by students and not mandatory. Only students with a Cumulative GPA of 2.70 or above may be considered for Secondary Major enrolment. Students must apply to and obtain approval from programme offering Department no later than the commencement of second year of study, to be admitted to the Secondary Major.

(f) Professional Accreditation

The department is currently working with the professional bodies on the accreditation of this programme with secondary major.

(g) Credit Requirement for Secondary Major

Discipline-Specific Requirements	79 academic credits (Core: 76 credits and Elective: 3 credits)
Training Requirements	10 IC training credits
Secondary Major Requirements	36 academic credits
General University Requirements	30 academic credits
Double counted credits for both PE disciplines-specific and IE requirements	3 academic credits
Credit requirement for graduation	142 academic credits + 10 IC training credits

PROGRESSION PATTERN OF CURRICULUM (PE+IE)

1. (a) For students who <u>have</u> Level 2 or above in HKDSE Physics (or Combined Science with a component in Physics), or the equivalent qualifications.
(b) For non-local students from the Chinese Mainland who <u>have</u> a Pass (a pass is taken as 60% of the total marks of the subject) in the Physics or Integrated Science subject in Joint Entrance Examination for universities.

(Total Credits Required for Graduation: 142 academic credits + 10 IC training credits)

Year 1 (33 academic credits + 4 IC training credits)			
Semester 1 (18 credits + 2 IC)		**Semester 2 (15 credits + 2 IC)**	
Healthy Lifestyle#	0	Healthy Lifestyle# – cont'd	0
English I (LCR I)#	3	English II (LCR II)#	3
CAR I#	3	Introduction to Innovation and Entrepreneurship (MM1031)#	1
CAR II#	3	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life (ISE1001)#	2
Tomorrow's Leader (APSS1L01)#	3	Information Technology (ENG2003)	3
Basic Mathematics I – Calculus and Probability and Statistics (AMA1110)	3	Basic Mathematics II – Calculus and Linear Algebra (AMA1120)	3
Physics I (AP10005)	3	Physics II (AP10006)	3
Engineering Communication and Fundamentals (ISE2105)	2 IC	Engineering Communication and Fundamentals (ISE2105) – cont'd	2 IC
Year 2			
Semester 1 (18 credits)			
CAR III#	3		
Chinese Communication (LCR III)#	3		
Fundamentals of Materials Science and Engineering (ENG2001) / Biology@ / Chemistry+	3		
Mathematics I (AMA2111)	3		
Management and Organization (MM2021)~	3		
Quality Engineering (ISE369)	3		

2. (a) For students who do not have Level 2 or above in HKDSE Physics (or Combined Science with a component in Physics), or the equivalent qualifications.
(b) For non-local students from the Chinese Mainland who do not have a Pass (a pass is taken as 60% of the total marks of the subject) in the Physics or Integrated Science subject in Joint Entrance Examination for universities.
Students are required to take and complete "Introduction to Physics (AP10001)" which also fulfil a CAR D subject before graduation.

(Total Credits Required for Graduation: 142 credits + 10 IC training credits)

Year 1 (30 academic credits + 4 IC training credits)			
Semester 1 (15 credits + 2 IC)		**Semester 2 (15 credits + 2 IC)**	
Healthy Lifestyle#	0	Healthy Lifestyle# – cont'd	0
English I (LCR I)#	3	English II (LCR II)#	3
CAR I# Introduction to Physics (AP10001) = CAR D	3	Introduction to Innovation and Entrepreneurship (MM1031)#	1
CAR II#	3	Basic Artificial Intelligence and Data Analytics for Efficiency and Effectiveness in Daily Life (ISE1001)#	2
Tomorrow's Leader (APSS1L01)#	3	Information Technology (ENG2003)	3
Basic Mathematics I – Calculus and Probability and Statistics (AMA1110)	3	Basic Mathematics II – Calculus and Linear Algebra (AMA1120)	3
-		Physics I (AP10005)	3
Engineering Communication and Fundamentals (ISE2105)	2 IC	Engineering Communication and Fundamentals (ISE2105) – cont'd	2 IC
Year 2			
Semester 1 (21 credits)			
CAR III#	3		
Chinese Communication (LCR III)#	3		
Fundamentals of Materials Science and Engineering (ENG2001) / Biology@ / Chemistry+	3		
Mathematics I (AMA2111)	3		
Management and Organization (MM2021)~	3		
Quality Engineering (ISE369)	3		
Physics II (AP10006)	3		

Year 2			
		Semester 2 (17 credits + 3 IC)	
		CAR IV#	3
		Creativity, Innovation and Entrepreneurship (LGT3161) / (MM3161)~	3
		Electricity and Electronics (EIE2302)	3
		Professional Communication in Chinese (CLC3241P)	2
		Society and the Engineer (ENG3004)	3
		IE Elective 1~	3
		Appreciation of Manufacturing Technologies (ISE2121)	3 IC
Summer Term (3 academic credits)			
GBA Immersion (MM2901) / Field Study for Innovation Ecosystem (MM2902)~	3		
Year 3 (35 academic credits + 3 IC training credits)			
Semester 1 (18 credits + 1.5 IC)		**Semester 2 (17 credits + 1.5 IC)**	
Instrumentation and Automation Systems (ISE2002)	3	Service Learning#	3
Integrated Design for Manufacture (ISE386)	3	Tool Design (ISE306)	3
Operation Research I (ISE3001)	3	Integrated Product Engineering Project I (ISE3007)	3
Innovation and Entrepreneurship Colloquium (MM3162)~	3	Professional Communication in English for Engineering Students (ELC3531)	2
Discipline-specific Elective 1~	3	Engineering Management (ENG3003)	3
IE Elective 2~	3	General Elective 1~	3
Integrated Project (ISE3103)	1.5 IC	Integrated Project (ISE3103) – cont'd	1.5 IC

Year 4 (36 academic credits)			
Semester 1 (18 credits)		**Semester 2 (18 credits)**	
Computer-Aided Product Design (ISE418)	3	Product Safety and Reliability (ISE330)	3
New Product Planning and Development (ISE430)^ (=Discipline-specific Elective 2)	3	Eco-design and Manufacture (ISE4005)	3
Industrial Control Systems and Their Applications (ISE3019)	3	Business Innovation Project (MM4393)~	3
PE Elective 1	3	Robotics and Automation Systems (ISE4024)	3
Capstone Project (ISE445)	3	Capstone Project (ISE445) – cont'd	3
Company Attachment (ISE4018)~	3	Company Attachment (ISE4018)~ – cont'd	3

Elective subjects

PE Electives	Select any **ONE** from the following subjects
	• Total Quality Management (ISE404) • Advanced Manufacturing Technology (ISE4009) • Marketing Management in China (MM4721) • Global Marketing (MM4732) • Sales and Distribution Management (MM4782) • Design in Business for Engineering (SD4041) • Sustainable Product Design (SD4463)
IE Electives	Select any **TWO** from the subject list Link
Discipline-specific Electives	Select any **TWO** from the subject list Link
General Electives	Select any **ONE** from the subject list Link

General University Requirements (GUR) The pattern for GUR subjects are indicative only. Students may take these subjects according to their own schedule.
~ Secondary Major in IE subjects
^ Double-counted subjects to fulfill both PE and IE requirements (not exceed 12 credits)

@Biology subjects are listed below:
- Biotechnology and Human Health (ABCT1D03/ABCT1303)~
- Introductory Life Science (ABCT1D04/ABCT1101)~
- Bionic Human and the Future of Being Human (BME1D01/BME11101)~

+Chemistry subjects are listed below:
- Chemistry and Modern Living (ABCT1D01/ABCT1301)~
- Chemistry and Sustainable Development (ABCT1D14/ABCT1314)~

Double Fulfilment of DSR and CAR

Some DSR subjects are also designated as CAR subjects under the four cluster areas. They are the same subjects designated with different subject codes. Upon passing them, you will fulfill the requirements of both DSR and CAR. However, credits will not be counted twice. For example, if you have taken

MM2711, you have fulfilled the CAR BN requirement and earned only 3 credits instead of 6 credits. So you may need to take other subjects to make up the total credit requirement of the award. The list of subjects that fulfill both DSR and CAR are shown below:

DSR Subjects	CAR Subjects	Cluster Area	Subject Title
MM2711	MM2BN05	CAR – BN	Introduction to Marketing
ABCT1101	ABCT1D04	CAR – D	Introductory Life Science
ABCT1301	ABCT1D01	CAR – D	Chemistry and Modern Living
ABCT1314	ABCT1D14	CAR – D	Chemistry and Sustainable Development
ABCT1303	ABCT1D03	CAR – D	Biotechnology and Human Health
BME11101	BME1D01	CAR – D	Bionic Human and the Future of Being Human
AP10001	AP1D03	CAR – D	How Things Work: the Physics of Everyday Life