**INDUSTRIAL ENGINEERING AND TECHNOLOGY MANAGEMENT**

**SYLLABUS**
**(Applicable to students admitted in the academic year 2012-13)**

Definitions and Terminology

Each course offered by the Department of Industrial and Manufacturing Systems Engineering shall be classified as either introductory level course or advanced level course, and be assigned a Level --- One, Two or Three, in which Level One courses are introductory courses whereas advanced courses includes Level Two and Three courses. The course level is indicated in the first left-most digit of the 4-digit numeral in the latter half of the course code. As an example, a Level One course shall read <IMSE1xxx>.

A Core course is a course in the curriculum that a candidate must take and pass according to the criteria provided in the Regulations. A Discipline Elective course refers to any optional subject offered by the Department, provided that it does not overlap significantly with the other courses that the student has already enrolled in. An Elective Courses is a course offered by other departments under the Faculty of Engineering, or by other faculties.

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The Curriculum

The curriculum comprises 180 credits of courses as follows:

(a) 96 credits of Core Engineering courses of the curriculum, including:
  (i) Integrative project (6 credits)
  (ii) Technical project (12 credits)
  (iii) either (1) ENGG1002 Computer programming and applications (6 credits) or
  ENGG1016 Computer programming and applications I (6 credits)
  (iv) either (1) ENGG1003 Mathematics I (6 credits) or
  (2) ENGG1004 Mathematics IA (3 credits) and
  IMSE1018 Mathematics (IMSE) (3 credits)
(b) 51 credits of Elective courses, including:
  (i) Discipline Elective courses (36 credits)
  (ii) General Engineering Courses (12 credits)
  (iii) Elective course (3 credits)
(c) 9 credits of Language Enhancement courses, comprising:
  (i) Professional and technical written communication for engineers (3 credits)[21]
  (ii) Professional and technical oral communication for engineers (3 credits)
  (iii) Practical Chinese language course for engineering students (3 credits)[22]
(d) Common Core Curriculum Courses (selecting not more than one course from each Area of Inquiry)
  (12 credits)
(e) Engineering training (6 credits)

[21] Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1509

[22] Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

(f) Internship (6 credits)

To complete the curriculum, a candidate must enroll in all the courses specified in the curriculum, and must pass the courses listed under (a) to (f) for a combination totaling to 180 credits.

Degree Classification

All the 180 credits under the curriculum will be counted towards degree classification, according to the following:

(a) 9 credits of Language Enhancement courses;
(b) 96 credits of Core Engineering courses;
(c) 12 credits of Engineering training and Internship;
(d) 12 credits of Common Core Courses;
(e) The remaining courses with the best results, including at least 36 credits of Discipline Elective courses, 12 credits of General Engineering Courses and 3 credits of Elective course.

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Order of Study

Order of study is dictated by the prerequisite and the co-requisite requirements. Generally, Level One courses should be taken before Level Two courses, Level Two courses should be taken before Level Three courses and Core Engineering courses should be taken before Discipline Elective courses.

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**First Year**

Loading

The normal loading is 60 credits of Level One courses, with 30 credits of courses in each semester. Students are required to do Engineering Training (6 credits / Major Course Level: Introductory) within the 60 credits of courses.

Courses

Students must take the examination/coursework/continuous assessment in the following courses and pass the courses listed under (a) to (f):

(a) Core Engineering courses (24 credits)
(b) 2 Elective courses from the General Engineering Courses (12 credits)
(c) 3 Language Enhancement courses (9 credits) consisting of
  (i) 2 English Communications courses (6 credits)
  (ii) 1 Chinese Language course (3 credits)
(d) 1 course from the Common Core Curriculum (6 credits)
(e) 1 elective course offered by other departments of the Faculty of Engineering or other faculties (3 credits)
(f) Engineering Training (6 credits)

| *Core Engineering Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |

| | | | | |
|---|---|---|---|---|
| IMSE1003 | Introduction to business and management | 6 | 1 | Introductory |
| IMSE1009 | Fundamentals of engineering design | 6 | 1 | Introductory |
| ENGG1003 | Mathematics I | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1004 | Mathematics IA | 3 | 1 | N/A |
| IMSE1018 | Mathematics (IMSE) | 3 | 1 | Introductory |
| ENGG1002 | Computer programming and applications | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1016 | Computer programming and applications I | 6 | 1&2 | N/A |
| Credits required: 24 | | | | |

| *General Engineering Courses* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| ENGG1009 | Industrial management and logistics | 6 | 1 |
| ENGG1006 | Engineering for sustainable development | 6 | 1 |
| ENGG1007 | Foundations of computer science | 6 | 1 |
| ENGG1011 | Introduction to biomedical engineering | 6 | 1 |
| ENGG1015 | Introduction to electrical and electronic engineering | 6 | 1 |
| ENGG1018 | Introduction to mechanical engineering | 6 | 1 |
| Select 2 courses from the above General Engineering Courses; credits required: 12 | | | |

| *Language Enhancement Courses* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| CAES1509 | Professional and technical written communication for engineers[23] | 3 | 1 |
| CAES1515 | Professional and technical oral communication for engineers | 3 | 1 |
| CENG1001 | Practical Chinese language course for engineering students[24] | 3 | 1 |
| Credits required: 9 | | | |

| *Common Core / Elective Courses* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | Common Core Course | 6 | 1 |
| | (Any Elective course) | 3 | 1 |
| Credits required: 9 | | | |

| *Training* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| IMSE1021 | Engineering Training | 6 | Summer |
| Credits required: 6 | | | |

[23] Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1509

[24] Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

**Second Year**

Loading

The normal loading for a student is 60 credits of Level Two courses, with 30 credits of courses in each semester. Students are required to do Internship (6 credits / Major Course Level: Advanced) within the 60 credits of courses.

Courses

Students must take the examination/coursework/continuous assessment in the following courses and pass the courses listed under (a) to (d).

(a) 7 Core Engineering courses (42 credits)
(b) 1 Discipline Elective course (6 credits)
(c) 1 course from the Common Core Curriculum (6 credits)
(d) Internship (6 credits)

| *Core Engineering Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE2005 | Managerial accounting and finance | 6 | 1 | Advanced |
| IMSE2006 | Manufacturing technology | 6 | 1 | Advanced |
| IMSE2008 | Operational research techniques | 6 | 1 | Advanced |
| IMSE2009 | Quality management | 6 | 1 | Advanced |
| IMSE2024 | Mathematics II | 6 | 1 | Advanced |
| IMSE2025 | Integrative studies (IE practice) | 6 | 1 | Advanced |
| IMSE2026 | Engineers in society | 6 | 1 | Advanced |
| Credits required: 42 | | | | |

| *Discipline Elective Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| Select 1 course from the list of Discipline Elective Courses; credits required: 6 | | | | |

| *Common Core Course* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | Common Core Course | 6 | 1 |
| Credits required: 12 | | | |

| *Training* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| IMSE2029 | Internship | 6 | Summer |
| Credits required: 6 | | | |

**Third Year**

Loading

The normal loading for a student is 60 credits of Level Three courses, with 30 credits of courses in each semester.

Courses

Students must take the examination/coursework/continuous assessment in the following courses and pass the courses listed under (a) and (b):

(a) 4 Core Engineering courses (30 credits), comprising:
  (i) IMSE3001 Computer integrated manufacturing (6 credits)
  (ii) Technical Project - IMSE3014 Project (12 credits)
  (iii) Integrative project - IMSE3015 Industrial systems integration (6 credits)
  (iv) IMSE3016 Operations planning and controls (6 credits)

(b) A combination of Discipline Elective courses totaling to 30 credits

| *Core Engineering Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE3001 | Computer integrated manufacturing | 6 | 1 | Advanced |
| IMSE3014 | Project | 12 | 2 | Advanced |
| IMSE3015 | Industrial systems integration | 6 | 2 | Advanced |
| IMSE3016 | Operations planning and control | 6 | 1 | Advanced |
| Credits required: 30 | | | | |

| *Discipline Elective Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| Select 5 courses from the list of Discipline Elective courses: credits required: 30 | | | | |
| Credits required: 30 | | | | |

*List of Discipline Elective Courses (IETM)*

| Code | Title | Credits | Length (Sem) | Major Course Level |
|---|---|---|---|---|
| IMSE1012 | Engineering technology | 6 | 1 | Introductory |
| IMSE1013 | Introduction to information systems | 6 | 1 | Introductory |
| IMSE1014 | Product development | 6 | 1 | Introductory |
| IMSE1017 | Engineering systems analysis | 6 | 1 | Introductory |
| IMSE1019 | Industrial systems modeling and simulation | 6 | 1 | Introductory |
| IMSE0201 | Supply chain design and development | 6 | 1 | Advanced |
| IMSE2003 | Industrial automation | 6 | 1 | Advanced |
| IMSE2016 | Internet technology for e-commerce | 6 | 1 | Advanced |
| IMSE2018 | Industrial organisation and management | 6 | 1 | Advanced |
| IMSE2019 | Stochastic decision systems | 6 | 1 | Advanced |
| IMSE2027 | Facilities planning and design | 6 | 1 | Advanced |

| | | | | |
|---|---|---|---|---|
| IMSE2028 | Human factors engineering | 6 | 1 | Advanced |
| IMSE3002 | Engineering project management | 6 | 1 | Advanced |
| IMSE3010 | Financial engineering | 6 | 1 | Advanced |
| IMSE3018 | Advanced manufacturing technology | 6 | 1 | Advanced |
| IMSE3019 | Digital enterprises and e-commerce | 6 | 1 | Advanced |
| IMSE3020 | Technology marketing | 6 | 1 | Advanced |
| IMSE3021 | Strategic management of business and technology | 6 | 1 | Advanced |
| IMSE3028 | Innovation and entrepreneurship | 6 | 1 | Advanced |
| IMSE3029 | Manufacturing system analysis and design | 6 | 1 | Advanced |
| Credits required: | | | | |
| Level 1: | Students have an option to choose one of the above courses to fulfill the 3-credit elective course requirement. | | | |
| Level 2: | 6 | | | |
| Level 3: | 30 | | | |

**Summary of the prerequisite relationship between First, Second and Third Year courses**

**First Year**

| Code | Title | Prerequisite |
|---|---|---|
| Core Engineering courses | | |
| IMSE1003 | Introduction to business and management | None |
| IMSE1009 | Fundamentals of engineering design | None |
| ENGG1003 | Mathematics I | None |
| **OR** | | |
| ENGG1004<br>IMSE1018 | Mathematics IA Mathematics (IMSE) | None<br>None |
| ENGG1002 | Computer programming and applications | None |
| **OR** | | |
| ENGG1016 | Computer programming and applications I | None |
| General Engineering Courses | | |
| ENGG1009 | Industrial management and logistics | None |
| ENGG1006 | Engineering for sustainable development | None |
| ENGG1007 | Foundations of computer science | None |
| ENGG1011 | Introduction to biomedical engineering | None |
| ENGG1015 | Introduction to electrical and electronic engineering | None |
| ENGG1018 | Introduction to mechanical engineering | None |

**Second Year**

| Code | Title | Prerequisite |
|---|---|---|
| Core Engineering Courses | | |
| IMSE2005 | Managerial accounting and finance | IMSE1003 Introduction to business |

| | | |
|---|---|---|
| | | management |
| IMSE2006 | Manufacturing technology | None |
| IMSE2008 | Operational research techniques | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2009 | Quality management | None |
| IMSE2024 | Mathematics II | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2025 | Integrative studies (IE practice) | None |
| IMSE2026 | Engineers in society | None |
| Discipline Elective Courses (6 credits) | | |
| IMSE1012 | Engineering technology | None |
| IMSE1013 | Introduction to information systems | None |
| IMSE1014 | Product development | None |
| IMSE1017 | Engineering systems analysis | None |
| IMSE1019 | Industrial systems modeling and simulation | None |
| IMSE0201 | Supply chain design and development | IMSE1003 Introduction to business and management |
| IMSE2003 | Industrial automation | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2016 | Internet technology for e-commerce | None |
| IMSE2018 | Industrial organisation and management | IMSE1003 Introduction to business and management |
| IMSE2019 | Stochastic decision systems | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2027 | Facilities planning and design | |
| IMSE2028 | Human factors engineering | None |
| IMSE3002 | Engineering project management | Co-requisite:<br>IMSE2008 Operational research techniques |
| IMSE3010 | Financial engineering | IMSE2005 Managerial accounting and finance |
| IMSE3018 | Advanced manufacturing technology | IMSE2006 Manufacturing technology |
| IMSE3019 | Digital enterprises and e-commerce | IMSE2016 Internet technology for e-commerce<br>or<br>IMSE1013 Introduction to information systems<br>or<br>IMSE1008 Computer applications |

| | | |
|---|---|---|
| | | for engineers<br>or<br>ENGG1002 Computer programming and applications<br>or<br>ENGG1013 Computer programming and applications IA<br>and<br>ENGG1014 Computer programming and applications IB<br>or<br>ENGG1016 Computer programming and applications I |
| IMSE3020 | Technology marketing | IMSE1003 Introduction to business and management |
| IMSE3021 | Strategic management of business and technology | IMSE1003 Introduction to business and management |
| IMSE3028 | Innovation and entrepreneurship | None |
| IMSE3029 | Manufacturing system analysis and design | IMSE2008 Operational research techniques |

**Third Year**

| Code | Title | Prerequisite |
|---|---|---|
| Core Engineering Courses | | |
| IMSE3001 | Computer integrated manufacturing | IMSE1009 Fundamentals of engineering design |
| IMSE3014 | Project | None |
| IMSE3015 | Industrial systems integration | None |
| IMSE3016 | Operations planning and control | IMSE2008 Operational research techniques |
| Discipline Elective Courses (30 credits) | | |
| IMSE1012 | Engineering technology | None |
| IMSE1013 | Introduction to information systems | None |
| IMSE1014 | Product development | None |
| IMSE1017 | Engineering systems analysis | None |
| IMSE1019 | Industrial systems modeling and simulation | None |
| IMSE0201 | Supply chain design and development | IMSE1003 Introduction to business and management |
| IMSE2003 | Industrial automation | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2016 | Internet technology for e-commerce | None |
| IMSE2018 | Industrial organisation and management | IMSE1003 Introduction to business |

| | | |
|---|---|---|
| | | and management |
| IMSE2019 | Stochastic decision systems | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2027 | Facilities planning and design | |
| IMSE2028 | Human factors engineering | None |
| IMSE3002 | Engineering project management | Co-requisite:<br>IMSE2008 Operational research techniques |
| IMSE3010 | Financial engineering | IMSE2005 Managerial accounting and finance |
| IMSE3018 | Advanced manufacturing technology | IMSE2006 Manufacturing technology |
| IMSE3019 | Digital enterprises and e-commerce | IMSE2016 Internet technology for e-commerce<br>or<br>IMSE1013 Introduction to information systems<br>or<br>IMSE1008 Computer applications for engineers<br>or<br>ENGG1002 Computer programming and applications<br>or<br>ENGG1013 Computer programming and applications IA<br>and<br>ENGG1014 Computer programming and applications IB<br>or<br>ENGG1016 Computer programming and applications I |
| IMSE3020 | Technology marketing | IMSE1003 Introduction to business and management |
| IMSE3021 | Strategic management of business and technology | IMSE1003 Introduction to business and management |
| IMSE3028 | Innovation and entrepreneurship | None |
| IMSE3029 | Manufacturing system analysis and design | IMSE2008 Operational research techniques |

## COURSE DESCRIPTIONS

### Level One

## A. Core Engineering Courses

**IMSE1003. Introduction to business and management (6 credits)**

Business of production; business environment, globalization, the positions of Hong Kong and China; marketing and distribution; the firm and the customer; the firm and its suppliers; finance and the firm; costs of production; human resource management; introduction to manufacturing systems; management and integration; the engineer in society, professional ethics; development of technology and interaction between societies and technology, intellectual property; the environment and safety.

Assessment: 30% continuous assessment, 70% examination

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**IMSE1009. Fundamentals of engineering design (6 credits)**

Visualization of technical information; application of CAD software to prepare product design models and drawings; principles of engineering graphics: orthographic projections, isometric views, auxiliary views, sectioning, dimensioning and tolerancing; assembly modelling and drawing; design of components; general principles of product and tool design.

Assessment: 100% continuous assessment

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**IMSE1018. Mathematics (IMSE) (3 credits)**

Probability laws, random variables, probability distributions and expectation; optimization of functions of two or more variables; numerical methods in root-finding, approximation and integration of single variable functions.

Assessment: 10% continuous assessment, 90% examination

## B. Language Enhancement Courses

**CAES1509. Professional and technical written communication for engineers (3 credits)**

The focus of this course is the function and importance of professional and technical communication in English and specifically understanding and using written English. Topics include accessing, abstracting, analyzing, organizing and summarizing information; making effective grammatical and lexical choices; technical report writing; small-scale project design and implementation. Assessment is wholly by coursework.

Assessment: 100% continuous assessment

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**CAES1515. Professional and technical oral communication for engineers (3 credits)**
**CENG1001. Professional Chinese language course for engineering students (3 credits)**

Please refer to the University Language Enhancement Courses in the syllabus for the degree of BEng for details.

**C. Common Core Course (6 credits)**

**D. Elective Course (3 credits)**

**E. Engineering Training**

**IMSE1021. Engineering training (6 credits)**

Metal work, manufacturing practice, practical networking, computing practice, design practice, plastic processing, metrology, CNC programming and CAD/CAM, electronics, work study.

Assessment: 100% practical work

**Level Two**

**A1. Core Engineering Courses**

**IMSE2005. Managerial accounting and finance (6 credits)**

Cost accounting - procedures; direct costs, absorption costing; marginal costing. Planning and control - budgetary planning systems; standard costing systems; capital expenditure and investment; health, safety and environmental aspects of company activities; contemporary issues in management accounting; financial accounting - accounting rules; basic financial accounts; manufacturing accounts; company account; financial performance - cash flow statements; interpretation of accounting data.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

**IMSE2006. Manufacturing technology (6 credits)**

Introduction to manufacturing, safety in manufacturing, manufacturing and the environment; metrology, measuring standards, limits and fits, geometrical tolerances, limit gauging, surface texture; casting processes, pattern and gating, permanent and non-permanent moulds; forming processes, principles of bulk deformation and sheet metal working; joining processes, fastening, liquid and solid states welding, powder metallurgy; machining processes, cutting and grinding operations, non-traditional machining, cutting conditions; plastics materials and processing.

Assessment: 25% continuous assessment and 75% examination

**IMSE2008. Operational research techniques (6 credits)**

Philosophy and methodology of Operational Research: problem analysis, establishing objectives, identifying decision variables, model building, implementation and monitoring solutions; Operational Research techniques and their applications in operations management: linear programming and its

extensions, dynamic programming, queuing theory, and replacement models for single components and capital equipment.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 10% continuous assessment, 90% examination

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**IMSE2009. Quality management (6 credits)**

Total quality management; management tools for quality; benchmarking; quality assurance management systems; ISO9000 series; national quality awards; design of industrial experiments; statistical process control; control charts; acceptance sampling; environmental management; ISO14000 series; environmental management systems; business process reengineering; customer services quality.

Assessment: 30% continuous assessment, 70% examination

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**IMSE2024. Mathematics II ( 6 credits)**

Probability laws, random variables, probability distributions and expectation; some important discrete and continuous distributions; random samples and sampling distributions; parameter estimation and hypothesis testing; design of experiments and analysis of variance; regression analysis; non-parametric methods; statistical quality control and reliability engineering; introduction to stochastic processes and Markov chains; application examples in industrial and logistics engineering.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 10% continuous assessment, 90% examination

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**IMSE2025. Integrative studies (IE practice) (6 credits)**

To develop students in the areas of technical literature survey, analysis and assimilation of materials, skills of written and oral presentation, composition and implementation of ideas, communication and interactive skills through student and product centred activities, interactive and project-based learning.

The major element of the module is a group project on the product and manufacturing system design of a manufactured product. The group project is to integrate the applications of various topics including: project management; product life-cycle management; manufacturing logistics; cost accounting; scheduling; process planning and workflow; human factors; distribution and marketing.

Assessment: 100% continuous assessment

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**IMSE2026. Engineers in society (6 credits)**

Economic, industrial and social context of engineering; responsibilities of professional engineers, the legal, environmental, economical and ethical roles of engineers in society, judgment and decision process based on non-technical aspects such as financial, environmental and cultural considerations, meeting with

professional engineers from the industrial and logistics sectors.

Assessment: 30% continuous assessment, 70% examination

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**A2. Discipline Elective Courses**

**IMSE1012. Engineering technology (6 credits)**

Kinematics and dynamics of rigid bodies, centre of percussion, design for reduction of impact stress; analysis, simulation and applications of 4-bar mechanisms, velocity diagram and instantaneous centre of rotation; Geneva mechanism, gear train and motion transmission; analysis and applications of simple harmonic motion, damping of vibrations; fundamental electrical circuit analysis; alternating current electricity, AC circuits sand phasors.

Assessment: 20% continuous assessment, 80% examination

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**IMSE1013. Introduction to information systems (6 credits)**

Information systems; the strategic role of information technology; data communications and networking; applications of networks and databases; development and implementation of information systems.

Assessment: 40% continuous assessment, 60% examination

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**IMSE1014. Product development (6 credits)**

Organisation and management, performance measurement; market research, product design specification, product safety, product and the environment, concept generation and selection, design review and improvements; product appraisal from functional, ergonomic and aesthetic, manufacturing and economical aspects; design theory and methodology, information / literature search.

Assessment: 40% continuous assessment, 60% examination

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**IMSE1017. Engineering systems analysis (6 credits)**

Fundamental and elements of engineering system; system analysis and design principles; structured system analysis and design method (SSADM), object-oriented analysis and design (OOAD); artificial intelligence techniques for system analysis and solution generation.

Assessment: 20% continuous assessment, 80% examination

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**IMSE1019. Industrial systems modeling and simulation (6 credits)**

Basic concepts of modelling and simulation; discrete-event simulation techniques; introduction to computer-aided simulation and the use of simulation packages; methodology of simulation study of industrial systems; model development for industrial systems, analysis of systems; model validation and

verification; analysis of simulation results, case studies of industrial and manufacturing systems using discrete event simulations.

Assessment: 40% continuous assessment, 60% examination

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**IMSE0201. Supply chain design and development (6 credits)**

Supply chain overview; operating objectives; barriers to internal integration; supply chain performance cycles; logistics positioning; supply chain environmental assessment; time-based supply chains; information flow; alternative supply chain strategies; supply chain integration theory; logistics location structure; warehouse location patterns; transportation economies; inventory economies; least total cost design; formulating supply chain strategy; planning and design supply chain methodology; supply chain administration and dimensions of change management.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 20% continuous assessment, 80% examination

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**IMSE2003. Industrial automation (6 credits)**

Conditions and justification for automation; basic components of industrial automation; electric, pneumatic/hydraulic systems, automation systems design, introduction to robotics. Open-loop and closed-loop control; system performance analysis, system stability assessment; analogue and digital control systems, and their applications in industry.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 20% continuous assessment, 80% examination

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**IMSE2016. Internet technology for e-commerce (6 credits)**

Overview of E-Business and E-Commerce: Electronic Business Solutions (EBS), 3-tiered architecture, EBS technologies; Business Models: Their new dimensions and impacts, types and choice; Design and development: user requirement analysis, system development paradigms, structured system development and object-oriented system development methods. Adoption and Implementation: internet programming, web-based system development, online database design and implementation, case studies and mini-project.

Assessment: 60% continuous assessment, 40% examination

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**IMSE2018. Industrial organisation and management (6 credits)**

Managing and managers; evolution of management theory; planning - decision making; strategic management; strategy implementation, strategic management; organising - organisational design and structure; power and the distribution of authority; managing organisational change and innovation; leading – motivation, leadership, teams and teamwork; controlling, principles of effective control, operations control.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE2019. Stochastic decision systems (6 credits)**

Decision analysis: decision making under uncertainty, axioms of decision analysis, methodology of decision analysis, analytical hierarchy approach, quantification of judgemental uncertainties, assessing utilities, and group decision problems; game theory and gaming: extensive and normal forms, zero-sum two-person games, two-persons nonzero-sum games, n-persons games, teaching and training and operational gaming; stochastic processes: random walks, recurrent events, Markov chains, and renewal-processes.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 30% continuous assessment, 70% examination

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**IMSE2027. Facilities planning and design (6 credits)**

Plant location problem; advanced techniques in plant layout design, computer-based layout planning, and quantitative approaches; materials handling, storage and warehousing for global manufacturing; lean manufacturing, cellular manufacturing, one-piece flow; workplace design in the information age; digital factory; fire safety and security; study cases drawn from the manufacturing and service industries.

Assessment: 30% continuous assessment, 70% examination

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**IMSE2028. Human factors engineering (6 credits)**

Human-organization interaction; human-machine interface usability and design; workplace safety and health; applied anthropometry and biomechanics; physical work and manual material handling; workplace and environmental design, illumination, noise, thermal; information processing; display and control; skills and learning; job design and shift work.

Assessment: 20% continuous assessment, 80% examination

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**B. Common Core Course (6 credits)**

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**C. Internship**

**IMSE2029. Internship (6 credits)**

A minimum of six week summer internship in the industry.

Assessment: 100% practical work

**Level Three**

**A1. Core Engineering Courses**

**IMSE3001. Computer integrated manufacturing (6 credits)**

Overview of Computer Integrated Manufacturing (CIM) system and CAD/CAM functions; geometric modelling in CAD - principles of surface and solid modelling; CNC applications in CAM; computer aided process planning, automated process planning; rapid and virtual manufacturing; CAD and CAM integration.

Prerequisite: IMSE1009 Fundamentals of Engineering Design
Assessment: 30% continuous assessment, 70% examination

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**Technical project**

**IMSE3014. Project (12 credits)**

A dissertation or report on a topic consisting of design, experimental or analytical investigation in the field of industrial engineering and technology management.

Assessment: 100% continuous assessment

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**Integrative project**

**IMSE3015. Industrial systems integration (6 credits)**

Student-centred learning on system integration and analysis and evaluation of system performance. The module covers the application of techniques as follows:
Business analysis and decision making process; industrial modelling and simulation; layout planning; project management, strategic management; industry analysis; value chain analysis and critical success factors.

Assessment: 100% continuous assessment

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**IMSE3016. Operations planning and control (6 credits)**

The use of operations planning and control systems in forecasting, scheduling and inventory control; functions and organisation of production and inventory control systems; demand forecasting; deterministic and stochastic inventory control problems; aggregate production planning; master production scheduling; requirements and capacity planning systems; operations scheduling and control of production systems; Just-In-Time techniques; balancing of assembly lines; information reporting and processing; supply chain management.

Prerequisite: IMSE2008 Operational research techniques
Assessment: Continuous assessment (20%) and Examination (80%)

## A2. Discipline Elective Courses

For the syllabuses of Discipline Elective Courses with the code IMSE1XXX and IMSE2XXX, please refer to the previous section Level 2 A2.

### IMSE3002. Engineering project management (6 credits)

Fundamentals of engineering project management; project environment; project evaluation; risk management process; project selection and proposal preparation; project scheduling and contingency setting and control; control of variation and claims; project management methodologies and techniques, change management; multi-criteria decision making process; analytic hierarchy process; PERT/GANTT techniques for project control and resources allocation; simulation of critical paths; case studies.

Co-requisite: IMSE2008 Operational research techniques
Assessment: 30% continuous assessment, 70% examination

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### IMSE3010. Financial engineering (6 credits)

Financial markets and financial securities, portfolio management and investment strategies; international finance, foreign exchange markets; project evaluation and financing, present value, cost of capital, cost-benefit ratio and internal rates of return; financial instruments, forwards, futures; swaps, options and hedging strategies; foreign trade and investment in China.

Prerequisite: IMSE2005 Managerial accounting and finance
Assessment: 30% continuous assessment, 70% examination

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### IMSE3018. Advanced manufacturing technology (6 credits)

Metal cutting and machining, analysis of cutter geometry and materials; mechanics of cutting, tool wear and tool life, cutting optimization, analysis of milling, grinding, EDM, ECM, LBM; analysis of metal forming processes; engineering plasticity, Upper-Bound Theorem, CAD/CAM for mould and dies, rapid prototyping technologies; melt rheology, temperature and pressure effects, viscosity, mixing systems, polymeric materials, analysis of injection, extrusion, mould and die design.

Prerequisite: IMSE2006 Manufacturing technology
Assessment: 20% continuous assessment, 80% examination

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### IMSE3019. Digital enterprises and e-commerce (6 credits)

Enterprise resource management; EDI applications; data mining and warehousing; virtual enterprises; advanced Internet and web applications in product development, industrial applications of virtual reality; electronic product and component cataloguing; cryptographic systems; capability maturity model; social accountability standard; E-commerce business models; technological, business planning and social issues of E-commerce; order taking and processing; electronic payment systems, smart cards.

Prerequisite: IMSE2016 Internet technology for e-commerce, or IMSE1013 Introduction to information

systems, or IMSE1008 Computer applications for engineers, or ENGG1002 Computer programming and applications, or ENGG1013 Computer programming and applications IA and ENGG1014 Computer programming and applications IB, or ENGG1016 Computer programming and applications I
Assessment: 40% continuous assessment, 60% examination

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**IMSE3020. Technology marketing (6 credits)**

Customer relationships and value, marketing strategies and plans, marketing environment, ethical and social responsibility in marketing, marketing mix, marketing research and forecasting, marketing segmentation and positioning, technology trend, distribution channels, intellectual property, e-marketing.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE3021. Strategic management of business and technology (6 credits)**

Analysis of the external environment and industry clusters for local industries – threats and opportunities from government policies as well as the legal, economic, social and technological environment; competitive forces from industry rivals, customers and other sources; analysis of internal weaknesses and strengths – resources, competences and success factors; mission and strategic intent; strategic directions and methods – conditions and implications; implementing and evaluating strategic changes; management for technology innovation.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE3028. Innovation and entrepreneurship (6 credits)**

Entrepreneurship in the new world economy, developments in the pacific region and greater China; general characteristics of entrepreneurs; enterprise formation, organizational structure, new economy business models; enterprise resources, business plan, venture capital; technological growth; environmental and contingency factors; case studies. Skill workshops: identifying strengths and improving skills; organising yourself and your time; communication; systematic problem solving; group work; negotiating and assertiveness; coping with pressure; leadership.

Assessment: 30% continuous assessment, 70% examination

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**IMSE3029. Manufacturing system analysis and design (6 credits)**

Types of manufacturing systems; modelling and analysis of manufacturing systems, material flow analysis, assembly line balancing, discrete-event simulation; stochastic modelling: Markov chains, central server model, network of queues; factory physics, effects of variability on performance; competitive manufacturing: just-in-time production, quick-response manufacturing; advanced manufacturing systems, group technology, flexible manufacturing systems, holonic manufacturing.

Prerequisite: IMSE2008 Operational research techniques

Assessment: 30% continuous assessment, 70% examination

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**DOUBLE-DEGREES IN BENG/BBA OPTION**
(Applicable to students admitted in the academic year 2010-11 and thereafter)

Candidates are given an option to pursue the double-degrees in BEng/BBA, subject to the approval of the Boards of the Faculty of Engineering and Faculty of Business and Economics upon their meeting the prescribed admission requirements as laid down by both the Faculty of Engineering and the Faculty of Business and Economics.

Candidates who have satisfied all the requirements of the BEng curriculum will be awarded the degree of Bachelor of Engineering. The BEng(IETM) curriculum under the double-degrees in BEng/BBA option is as follows:

**Exemptions**

Candidates who have taken and passed the courses BUSI1007 (Principles of Management) and BUSI0027 (Management accounting I) under the double-degrees in BEng/BBA option are automatically granted exemption for the courses IMSE1003 (Introduction to business and management), IMSE2005 (Managerial accounting and finance) and IMSE3021 (Strategic management of business and technology).

**First Year**

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1009 | Fundamentals of engineering design | 6 | 1 | Introductory |
| IMSE2009 | Quality management | 6 | 1 | Introductory |
| ENGG1003 | Mathematics I | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1004 | Mathematics IA | 3 | 1 | N/A |
| IMSE1018 | Mathematics (IMSE) | 3 | 1 | N/A |
| ENGG1002 | Computer programming and applications | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1016 | Computer programming and applications I | 6 | 1&2 | N/A |
| Credits required: 24 | | | | |

| General Engineering Courses | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| ENGG1009 | Industrial management and logistics | 6 | 1 |
| ENGG1006 | Engineering for sustainable development | 6 | 1 |
| ENGG1007 | Foundations of computer science | 6 | 1 |
| ENGG1011 | Introduction to biomedical engineering | 6 | 1 |
| ENGG1015 | Introduction to electrical and electronic engineering | 6 | 1 |
| ENGG1018 | Introduction to mechanical engineering | 6 | 1 |
| Select 2 courses from the above General Engineering Courses; credits required: 12 | | | |

| Language Enhancement Courses | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |

| | | | |
|---|---|---|---|
| CAES1907 | Business Communication | 3 | 1 |
| CAES1515 | Professional and technical oral communication for engineers | 3 | 1 |
| CENG1001 | Practical Chinese language course for engineering students | 3 | 1 |
| Credits required: 9 | | | |

| Common Core Courses | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | Common Core Course | 6 | 1 |
| | Common Core Course | 6 | 1 |
| Credits required: 12 | | | |

**Second Year**

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1021 | Engineering training | 6 | summer | Introductory |
| IMSE2006 | Manufacturing technology | 6 | 1 | Advanced |
| IMSE2008 | Operational research techniques | 6 | 1 | Advanced |
| IMSE2018 | Industrial organisation and management | 6 | 1 | Advanced |
| IMSE2024 | Mathematics II | 6 | 1 | Advanced |
| IMSE2025 | Integrative studies (IE practice) | 6 | 1 | Advanced |
| IMSE2026 | Engineers in society | 6 | 1 | Advanced |
| IMSE2027 | Facilities planning and design | 6 | 1 | Advanced |
| IMSE2028 | Human factors engineering | 6 | 1 | Advanced |
| Credits required: 54 | | | | |

**Third Year**

| Core Engineering courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE2029 | Internship | 6 | summer | Advanced |
| IMSE3001 | Computer integrated manufacturing | 6 | 1 | Advanced |
| IMSE3002 | Engineering project management | 6 | 1 | Advanced |
| IMSE3014 | Project | 12 | 2 | Advanced |
| IMSE3015 | Industrial systems integration | 6 | 2 | Advanced |
| IMSE3016 | Operations planning and controls | 6 | 1 | Advanced |
| IMSE3029 | Manufacturing system analysis and design | 6 | 1 | Advanced |
| Credits required: 48 | | | | |

| Elective Course | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | (Any Elective course) | 3 | 1 |
| Credits required: 3 | | | |

*Note: Candidates can refer to the previous sections for further information on the prerequisite*

*relationship and course syllabuses of the above-listed courses.*

To be eligible for proceeding to the BBA programme in the 4th year, candidates must (1) fulfill the requirements of the BEng curriculum; and (2) pass the 54 credits of courses, as listed below, as required by the Faculty of Business and Economics during their study for BEng:

| Course Code | Course | Credits |
|---|---|---|
| BUSI1002 | Introduction to accounting | 6 |
| BUSI1003 | Introduction to management information systems | 6 |
| BUSI1004 | Marketing | 6 |
| BUSI1007 | Principles of management | 6 |
| ECON1001 | Introduction to economics I | 6 |
| FINA1003 | Corporate finance | 6 |
| BUSI0027 | Management accounting I | 6 |
| | Electives (Any 2 courses in Finance, HRM or Marketing major) | 12 |
| | *Total* | *54* |

Subject to approval of the Board of the Faculty of Engineering, candidates who have completed the requirements of BEng and decide not to proceed to the study for BBA may be awarded with a minor as specified by the Faculty of Business and Economics, if they have completed not less than 36 credits of courses in compliance with the syllabuses for the minor programme.

To obtain the degree of BBA, candidates must satisfactorily complete 114 credits of courses, 54 of which shall be completed during the study for BEng and 60 of which shall be completed during the 4th year in accordance with the Regulations and Syllabuses for the Degree of BBA in Conjunction with the Degree of BEng.

*Note: Further details about the length and content of the courses listed may be obtained on application to the department concerned.*

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**MINOR OPTION - INDUSTRIAL ENGINEERING AND TECHNOLOGY MANAGEMENT**
(Applicable to students admitted in the academic year 2010-11 and thereafter)
(Candidates enrolled in BEng degree curriculum with specialism in either Industrial Engineering and Technology Management or Logistics Engineering and Supply Chain Management are NOT eligible to choose this Minor Option.)

Candidates are given an option to pursue the minor in Industrial Engineering and Technology Management, subject to approval of the Head of Department concerned. Candidates who wish to have their minor recorded on the transcript must take and pass all the required courses listed below in addition to the graduation requirements of their own degree curriculum:

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1019 | Industrial systems modeling and simulation | 6 | 1 | Introductory |
| IMSE2027 | Facilities planning and design | 6 | 1 | Advanced |
| Credits required: 12 | | | | |

| Discipline Elective Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credit-units | Length (Sem) | Major Course Level |
| IMSE1014 | Product development | 6 | 1 | Introductory |
| IMSE2005 | Managerial accounting and finance | 6 | 1 | Advanced |
| IMSE2008 | Operational research techniques | 6 | 1 | Advanced |
| IMSE2026 | Engineers in society | 6 | 1 | Advanced |
| IMSE3001 | Computer integrated manufacturing | 6 | 1 | Advanced |
| Select 4 courses from the above Discipline Elective Courses; credits required: 24 | | | | |

**LOGISTICS ENGINEERING AND SUPPLY CHAIN MANAGEMENT**

**SYLLABUS**
**(Applicable to students admitted in the academic year 2012-13)**

Definitions and Terminology

Each course offered by the Department of Industrial and Manufacturing Systems Engineering shall be classified as either introductory level course or advanced level course, and be assigned a Level --- One, Two or Three, in which Level One courses are introductory courses whereas advanced courses includes Level Two and Three courses. The course level is indicated in the first left-most digit of the 4-digit numeral in the latter half of the course code. As an example, a Level One course shall read <IMSE1xxx>.

A Core course is a course in the curriculum that a candidate must take and pass according to the criteria provided in the Regulations. A Discipline Elective course refers to any optional subject offered by the Department, provided that it does not overlap significantly with the other courses that the student has already enrolled in. An Elective Course is a course offered by other departments under the Faculty of Engineering, or by other faculties.

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The Curriculum

The curriculum comprises 180 credits of courses as follows:

(a) 96 credits of Core Engineering courses of the curriculum, including
  (i) Integrative project (6 credits)
  (ii) Technical project (12 credits)
  (iii) either (1) ENGG1002 Computer programming and applications (6 credits)
  or
  (2) ENGG1016 Computer programming and applications I (6 credits
  (iv) either (1) ENGG1003 Mathematics I (6 credits)
  or
  (2) ENGG1004 Mathematics IA (3 credits) and
  IMSE1018 Mathematics (IMSE) (3 credits)
(b) 51 credits of Elective courses, including:
  (i) Discipline Elective courses (36 credits)
  (ii) General Engineering Courses (12 credits)
  (iii) Elective course (3 credits)
(c) 9 credits of Language Enhancement courses, comprising:
  (i) Professional and technical written communication for engineers (3 credits)[25]
  (ii) Professional and technical oral communication for engineers (3 credits)
  (iii) Practical Chinese language course for engineering students (3 credits)[26]
(d) Common Core Curriculum Courses (selecting not more than one course from each Area of Inquiry) (12 credits)
(e) Engineering training (6 credits)
(f) Internship (6 credits)

[25] Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1509

[26] Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

To complete the curriculum, a candidate must enroll in all the courses specified in the curriculum and must pass the courses listed under (a) to (f) for a combination totaling to 180 credits.

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Degree Classification

All the 180 credits under the curriculum will be counted towards degree classification, according to the following:

(a) 9 credits of Language Enhancement courses;
(b) 96 credits of Core Engineering courses;
(c) 12 credits of Engineering training and Internship;
(d) 12 credits of Common Core Courses;
(e) The remaining courses with the best results, including at least 36 credits of Discipline Elective courses, 12 credits of General Engineering Courses and 3 credits of Elective course.

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Order of Study

Order of study is dictated by prerequisite and co-requisite requirements. Generally, Level One courses should be taken before Level Two courses, Level Two courses should be taken before Level Three courses and Core Engineering courses should be taken before Elective courses.

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**First Year**

Loading

The normal loading is 60 credits of Level One courses, with 30 credits of courses in each semester. Students are required to do Engineering Training (6 credits / Major Course Level: Introductory) within the 60 credits of courses.

Courses

Students must take the examination/coursework/continuous assessment in the following courses and pass the courses listed under (a) to (e).

(a) Core Engineering courses (30 credits)
(b) 2 Elective courses from the General Engineering Courses (12 credits)
(c) 3 Language Enhancement courses (9 credits) consisting of
    (i) 2 English Communications courses (6 credits)
    (ii) 1 Chinese Language course (3 credits)
(d) 1 Elective course offered by other departments of the Faculty of Engineering or other faculties (3 credits)
(e) Engineering Training (6 credits)

| *Core Engineering Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1003 | Introduction to business and management | 6 | 1 | Introductory |

| | | | | |
|---|---|---|---|---|
| IMSE1009 | Fundamentals of engineering design | 6 | 1 | Introductory |
| IMSE1016 | Fundamentals of business logistics | 6 | 1 | Introductory |
| ENGG1003 | Mathematics I | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1004 | Mathematics IA | 3 | 1 | N/A |
| IMSE1018 | Mathematics (IMSE) | 3 | 1 | N/A |
| ENGG1002 | Computer programming and applications | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1016 | Computer programming and applications I | 6 | 1&2 | N/A |
| Credits required: 30 | | | | |

| *General Engineering Courses* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| ENGG1009 | Industrial management and logistics | 6 | 1 |
| ENGG1006 | Engineering for sustainable development | 6 | 1 |
| ENGG1007 | Foundations of computer science | 6 | 1 |
| ENGG1011 | Introduction to biomedical engineering | 6 | 1 |
| ENGG1015 | Introduction to electrical and electronic engineering | 6 | 1 |
| ENGG1018 | Introduction to mechanical engineering | 6 | 1 |
| Select two courses from the above General Engineering courses; credits required: 12 | | | |

| *Language Enhancement Courses* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| CAES1509 | Professional and technical written communication for engineers[27] | 3 | 1 |
| CAES1515 | Professional and technical oral communication for engineers | 3 | 1 |
| CENG1001 | Practical Chinese language course for engineering students[28] | 3 | 1 |
| Credits required: 9 | | | |

| *Elective Course* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | (Any Elective course) | 3 | 1 |
| Credits required: 3 | | | |

| *Training* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| IMSE1021 | Engineering Training | 6 | Summer |
| Credits required: 6 | | | |

[27] Students pursuing double-degrees in BEng/BBA should take CAES1907 in lieu of CAES1509

[28] Putonghua-speaking students should take CUND0002 or CUND0003. Students who have not studied Chinese language during their secondary education / who have not attained the requisite level of competence in the Chinese language to take CENG1001 can apply (i) to take credit-bearing Cantonese or Putonghua language courses offered by the School of Chinese especially for international and exchange students; OR (ii) to be exempted from the Chinese language requirement and take an elective course in lieu.

**Second Year**

Loading

The normal loading is 60 credits of Level Two courses, with 30 credits of courses in each semester. Students are required to do Internship (6 credits / Major Course Level: Advanced) within the 60 credits of courses.

Courses

Students must take the examination/coursework/continuous assessment in the following courses and pass the courses listed under (a) to (d).

(a) 6 Core Engineering courses (36 credits)
(b) 1 Discipline Elective course (6 credits)
(c) 2 courses from the Common Core Curriculum, selecting not more than one course from each Area of Inquiry (12 credits)
(d) Internship (6 credits)

| *Core Engineering Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE0201 | Supply chain design and development | 6 | 1 | Advanced |
| IMSE2008 | Operational research techniques | 6 | 1 | Advanced |
| IMSE2021 | Transportation and distribution planning | 6 | 1 | Advanced |
| IMSE2024 | Mathematics II | 6 | 1 | Advanced |
| IMSE2026 | Engineers in society | 6 | 1 | Advanced |
| IMSE2035 | Integrative studies (LSC practice) | 6 | 1 | Advanced |
| Credits required: 36 | | | | |

| *Discipline Elective Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| Select 1 course from the list of Discipline Elective Courses; credits required: 6 | | | | |

| *Common Core Courses* | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | Common Core Course | 6 | 1 |
| | Common Core Course | 6 | 1 |
| Credits required: 12 | | | |

| Training | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| IMSE2029 | Internship | 6 | Summer |
| Credits required: 6 | | | |

**Third Year**

Loading

The normal loading for a student is 60 credits of Level Three courses (excluding summer vacation) with 30 credits of courses in each semester.

Courses

Students must take the examination/coursework/continuous assessment in the following courses and pass the courses listed under (a) and (b).

(a) 4 Core Engineering courses (30 credits) comprising:
  (i) IMSE3016 Operations planning and controls (6 credits)
  (ii) IMSE3022 Global logistics systems (6 credits)
  (iii) Technical project - IMSE 3024 Project (12 credits)
  (iv) Integrative project - IMSE3025 Industrial systems integration (6 credits)

(b) A combination of Discipline Elective courses totaling to 30 credits

| *Core Engineering Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE3016 | Operations planning and control | 6 | 1 | Advanced |
| IMSE3022 | Global logistics systems | 6 | 1 | Advanced |
| IMSE3024 | Project | 12 | 2 | Advanced |
| IMSE3025 | Logistics systems integration | 6 | 2 | Advanced |
| Credits required: 30 | | | | |

| *Discipline Elective Courses* | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| Select 5 courses from the list of Discipline Elective courses: credits required: 30 | | | | |
| Credits required: 30 | | | | |

*List of Discipline Elective Courses (LESCM)*

| Code | Title | Credits | Length (Sem) | Major Course Level |
|---|---|---|---|---|
| IMSE1012 | Engineering technology | 6 | 1 | Introductory |
| IMSE1013 | Introduction to information systems | 6 | 1 | Introductory |
| IMSE1014 | Product development | 6 | 1 | Introductory |
| IMSE1017 | Engineering systems analysis | 6 | 1 | Introductory |
| IMSE1029 | Logistics systems modeling and simulation | 6 | 1 | Advanced |
| IMSE2003 | Industrial automation | 6 | 1 | Advanced |
| IMSE2005 | Managerial accounting and finance | | | |
| IMSE2009 | Quality management | | | |
| IMSE2016 | Internet technology for e-commerce | 6 | 1 | Advanced |
| IMSE2018 | Industrial organisation and management | 6 | 1 | Advanced |
| IMSE2019 | Stochastic decision systems | 6 | 1 | Advanced |

| | | | | |
|---|---|---|---|---|
| IMSE2020 | Purchasing and supply management | | | |
| IMSE2027 | Facilities planning and design | 6 | 1 | Advanced |
| IMSE2028 | Human factors engineering | 6 | 1 | Advanced |
| IMSE3001 | Computer integrated manufacturing | 6 | 1 | Advanced |
| IMSE3002 | Engineering project management | 6 | 1 | Advanced |
| IMSE3010 | Financial engineering | 6 | 1 | Advanced |
| IMSE3019 | Digital enterprises and e-commerce | 6 | 1 | Advanced |
| IMSE3020 | Technology marketing | 6 | 1 | Advanced |
| IMSE3021 | Strategic management of business and technology | 6 | 1 | Advanced |
| IMSE3023 | Warehousing and terminal operations | 6 | 1 | Advanced |
| IMSE3028 | Innovation and entrepreneurship | 6 | 1 | Advanced |
| Credits required: | | | | |
| Level 1: | Students have an option to choose one of the above courses to fulfill the 3-credit elective course requirement. | | | |
| Level 2: | 6 | | | |
| Level 3: | 30 | | | |

**Summary of the prerequisite relationship between First, Second and Third Year courses**

**First Year**

| Code | Title | Prerequisite |
|---|---|---|
| Core Engineering courses | | |
| IMSE1003 | Introduction to business and management | None |
| IMSE1009 | Fundamentals of engineering design | None |
| IMSE1016 | Fundamentals of business logistics | None |
| ENGG1003 | Mathematics I | None |
| **OR** | | |
| ENGG1004<br>IMSE1018 | Mathematics IA<br>Mathematics (IMSE) | None<br>None |
| ENGG1002 | Computer programming and applications | None |
| **OR** | | |
| ENGG1016 | Computer programming and applications I | None |
| General Engineering Courses | | |
| ENGG1009 | Industrial management and logistics | None |
| ENGG1006 | Engineering for sustainable development | None |
| ENGG1007 | Foundations of computer science | None |
| ENGG1011 | Introduction to biomedical engineering | None |
| ENGG1015 | Introduction to electrical and electronic engineering | None |
| ENGG1018 | Introduction to mechanical engineering | None |

**Second Year**

| Code | Title | Prerequisite |
|---|---|---|
| Core Engineering Courses | | |
| IMSE0201 | Supply chain design and development | IMSE1003 Introduction to business and management |
| IMSE2008 | Operational research techniques | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA and<br>IMSE1018 Mathematics (IMSE) |
| IMSE2021 | Transportation and distribution planning | IMSE1016 Fundamentals of business logistics |
| IMSE2024 | Mathematics II | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA and<br>IMSE1018 Mathematics (IMSE) |
| IMSE2026 | Engineers in society | None |
| IMSE2035 | Integrative studies (LCS practice) | None |
| Discipline Elective Courses | | |
| IMSE1012 | Engineering technology | None |
| IMSE1013 | Introduction to information systems | None |
| IMSE1014 | Product development | None |
| IMSE1017 | Engineering systems analysis | None |
| IMSE1029 | Logistics systems modeling and simulation | None |
| IMSE2003 | Industrial automation | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2005 | Managerial accounting and finance | IMSE1003 Introduction to business and management |
| IMSE2009 | Quality management | |
| IMSE2016 | Internet technology for e-commerce | None |
| IMSE2018 | Industrial organisation and management | IMSE1003 Introduction to business and management |
| IMSE2019 | Stochastic decision systems | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2020 | Purchasing and supply management | None |
| IMSE2027 | Facilities planning and design | |
| IMSE2028 | Human factors engineering | None |
| IMSE3001 | Computer integrated manufacturing | IMSE1009 Fundamentals of engineering design |
| IMSE3002 | Engineering project management | Co-requisite:<br>IMSE2008 Operational research techniques |
| IMSE3010 | Financial engineering | IMSE2005 Managerial accounting |

| | | |
|---|---|---|
| | | and finance |
| IMSE3019 | Digital enterprises and e-commerce | IMSE2016 Internet technology for e-commerce<br>or<br>IMSE1013 Introduction to information systems<br>or<br>IMSE1008 Computer applications for engineers<br>or<br>ENGG1002 Computer programming and applications<br>or<br>ENGG1013 Computer programming and applications IA<br>and<br>ENGG1014 Computer programming and applications IB<br>or<br>ENGG1016 Computer programming and applications I |
| IMSE3020 | Technology marketing | IMSE1003 Introduction to business and management |
| IMSE3021 | Strategic management of business and technology | IMSE1003 Introduction to business and management |
| IMSE3023 | Warehousing and terminal operations | IMSE1016 Fundamentals of business logistics |
| IMSE3028 | Innovation and entrepreneurship | None |

**Third Year**

| Code | Title | Prerequisite |
|---|---|---|
| Core Engineering Courses | | |
| IMSE3016 | Operations planning and control | IMSE2008 Operational research techniques |
| IMSE3022 | Global logistics systems | IMSE1016 Fundamentals of business logistics |
| IMSE3024 | Project | None |
| IMSE3025 | Logistics systems integration | None |
| Discipline Elective Courses | | |
| IMSE1012 | Engineering technology | None |
| IMSE1013 | Introduction to information systems | None |
| IMSE1014 | Product development | None |
| IMSE1017 | Engineering systems analysis | None |
| IMSE1029 | Logistics systems modeling and simulation | None |

| | | |
|---|---|---|
| IMSE2003 | Industrial automation | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2005 | Managerial accounting and finance | IMSE1003 Introduction to business and management |
| IMSE2009 | Quality management | |
| IMSE2016 | Internet technology for e-commerce | None |
| IMSE2018 | Industrial organisation and management | IMSE1003 Introduction to business and management |
| IMSE2019 | Stochastic decision systems | ENGG1003 Mathematics I<br>or<br>ENGG1004 Mathematics IA *and*<br>IMSE1018 Mathematics (IMSE) |
| IMSE2020 | Purchasing and supply management | None |
| IMSE2027 | Facilities planning and design | IMSE2008 Operational research techniques |
| IMSE2028 | Human factors engineering | None |
| IMSE3001 | Computer integrated manufacturing | IMSE1009 Fundamentals of engineering design |
| IMSE3002 | Engineering project management | Co-requisite:<br>IMSE2008 Operational research techniques |
| IMSE3010 | Financial engineering | IMSE2005 Managerial accounting and finance |
| IMSE3019 | Digital enterprises and e-commerce | IMSE2016 Internet technology for e-commerce<br>or<br>IMSE1013 Introduction to information systems<br>or<br>IMSE1008 Computer applications for engineers<br>or<br>ENGG1002 Computer programming and applications<br>or<br>ENGG1013 Computer programming and applications IA<br>and<br>ENGG1014 Computer programming and applications IB<br>or<br>ENGG1016 Computer programming and applications I |
| IMSE3020 | Technology marketing | IMSE1003 Introduction to business and management |
| IMSE3021 | Strategic management of business and | IMSE1003 Introduction to business |

| | | | |
|---|---|---|---|
| | technology | | and management |
| IMSE3023 | Warehousing and terminal operations | IMSE1016 | Fundamentals of business logistics |
| IMSE3028 | Innovation and entrepreneurship | None | |

**COURSE DESCRIPTIONS**

**Level One**

**A. Core Engineering Courses**

**IMSE1003. Introduction to business and management (6 credits)**

Business of production; business environment, globalization, the positions of Hong Kong and China; marketing and distribution; the firm and the customer; the firm and its suppliers; finance and the firm; costs of production; human resource management; introduction to manufacturing systems; management and integration; the engineer in society, professional ethics; development of technology and interaction between societies and technology, intellectual property; the environment and safety.

Assessment: 30% continuous assessment, 70% examination

**IMSE1009. Fundamentals of engineering design (6 credits)**

Visualization of technical information; application of CAD software to prepare product design models and drawings; principles of engineering graphics: orthographic projections, isometric views, auxiliary views, sectioning, dimensioning and tolerancing; assembly modelling and drawing; design of components; general principles of product and tool design.

Assessment: 100% continuous assessment

**IMSE1016. Fundamentals of business logistics (6 credits)**

Definition, importance and objectives of business logistics; transport fundamentals and transport decisions; storage and handling systems and decisions; inventory policies; forecasting logistics requirements; facility location analysis; network planning process; purchasing scope and objectives; purchasing structure and organisation; purchasing variables – price, time and quality; buying commodities; buying capital goods; buying services; purchasing systems.

Assessment: 20% continuous assessment, 80% examination

**IMSE1018. Mathematics (IMSE) (3 credits)**

Probability laws, random variables, probability distributions and expectation; optimization of functions of two or more variables; numerical methods in root-finding, approximation and integration of single variable functions.

Assessment: 10% continuous assessment, 90% examination

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**B. Language enhancement courses**

**CAES1509. Professional and technical written communication for engineers (3 credits)**

The focus of this course is the function and importance of professional and technical communication in English and specifically understanding and using written English. Topics include accessing, abstracting, analysing, organizing and summarizing information; making effective grammatical and lexical choices; technical report writing; small-scale project design and implementation. Assessment is wholly by coursework.

Assessment: 100% continuous assessment

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**CAES1515. Professional and technical oral communication for engineers (3 credits)**
**CENG1001. Professional Chinese language course for engineering students (3 credits)**

Please refer to the University Language Enhancement Courses in the syllabus for the degree of BEng for details.

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**C. Elective Course (3 credits)**

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**D. Engineering Training**

**IMSE1021. Engineering training (6 credits)**

Metal work, manufacturing practice, practical networking, computing practice, design practice, plastic processing, metrology, CNC programming and CAD/CAM, electronics, work study.

Assessment: 100% practical work

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**Level Two**

**A1. Core Engineering Courses**

**IMSE0201. Supply chain design and development (6 credits)**

Supply chain overview; operating objectives; barriers to internal integration; supply chain performance cycles; logistics positioning; supply chain environmental assessment; time-based supply chains; information flow; alternative supply chain strategies; supply chain integration theory; logistics location structure; warehouse location patterns; transportation economies; inventory economies; least total cost design; formulating supply chain strategy; planning and design supply chain methodology; supply chain administration and dimensions of change management.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 20% continuous assessment, 80% examination

---

**IMSE2008. Operational research techniques (6 credits)**

Philosophy and methodology of Operational Research: problem analysis, establishing objectives, identifying decision variables, model building, implementation and monitoring solutions; Operational Research techniques and their applications in operations management: linear programming and its extensions, dynamic programming, queuing theory, and replacement models for single components and capital equipment.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 10% continuous assessment, 90% examination

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**IMSE2021. Transportation and distribution planning (6 credits)**

The evolution of transportation management; traffic management; transportation alternatives and technologies; transportation infrastructure; transportation performance analysis; total transportation cost analysis; fleet development and management; fleet performance indicators; routing and scheduling; shipment planning; containerisation-alternatives and selection criteria; mode selection criteria; transportation management and information systems requirements; international transportation strategies; implementation organisational issues.

Prerequisite: IMSE1016 Fundamentals of business logistics
Assessment: 30% continuous assessment, 70% examination

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**IMSE2024. Mathematics II (6 credits)**

Probability laws, random variables, probability distributions and expectation; some important discrete and continuous distributions; random samples and sampling distributions; parameter estimation and hypothesis testing; design of experiments and analysis of variance; regression analysis; non-parametric methods; statistical quality control and reliability engineering; introduction to stochastic processes and Markov chains; application examples in industrial and logistics engineering.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 10% continuous assessment, 90% examination

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**IMSE2026. Engineers in society (6 credits)**

Economic, industrial and social context of engineering; responsibilities of professional engineers, the legal, environmental, economical and ethical roles of engineers in society, judgment and decision process based on non-technical aspects such as financial, environmental and cultural considerations, meeting with professional engineers from the industrial and logistics sectors.

Assessment: 30% continuous assessment, 70% examination

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**IMSE2035. Integrative studies (LSC practice) (6 credits)**

To develop students in the areas of technical literature survey, analysis and assimilation of materials, skills of written and oral presentation, composition and implementation of ideas, communication and interactive skills through student and product centred activities, interactive and project-based learning.

The major element of the module is a group project on the design of a logistic system or a logistic-related product or service. The group project is to integrate the applications of various topics including: project management; product life-cycle management; business logistics; cost accounting; scheduling; transportation planning; material handling; workflow design; human factors; distribution and marketing.

Assessment: 100% continuous assessment

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**A2. Discipline Elective Courses**

**IMSE1012. Engineering technology (6 credits)**

Kinematics and dynamics of rigid bodies, centre of percussion, design for reduction of impact stress; analysis, simulation and applications of 4-bar mechanisms, velocity diagram and instantaneous centre of rotation; Geneva mechanism, gear train and motion transmission; analysis and applications of simple harmonic motion, damping of vibrations; fundamental electrical circuit analysis; alternating current electricity, AC circuits sand phasors.

Assessment: 20% continuous assessment, 80% examination

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**IMSE1013. Introduction to information systems (6 credits)**

Information systems; the strategic role of information technology; data communications and networking; applications of networks and databases; development and implementation of information systems.

Assessment: 40% continuous assessment, 60% examination

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**IMSE1014. Product development (6 credits)**

Organisation and management, performance measurement; market research, product design specification, product safety, product and the environment, concept generation and selection, design review and improvements; product appraisal from functional, ergonomic and aesthetic, manufacturing and economical aspects; design theory and methodology, information / literature search.

Assessment: 40% continuous assessment, 60% examination

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**IMSE1017. Engineering systems analysis (6 credits)**

Fundamental and elements of engineering system; system analysis and design principles; structured system analysis and design method (SSADM), object-oriented analysis and design (OOAD); artificial intelligence techniques for system analysis and solution generation.

Assessment: 20% continuous assessment, 80% examination

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**IMSE1029. Logistics systems modeling and simulation (6 credits)**

Basic concepts of modelling and simulation; discrete-event simulation techniques; introduction to computer-aided simulation and the use of simulation packages; methodology of simulation study of logistics systems and operation; model development for logistics systems, analysis of systems; model validation and verification; analysis of simulation results, case studies of logistics and supply chain systems using discrete event simulations.

Assessment: 40% continuous assessment, 60% examination

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**IMSE2003. Industrial automation (6 credits)**

Conditions and justification for automation; basic components of industrial automation; numerical control technology; pneumatic/hydraulic actuators, programmable logic controllers, electro-pneumatic systems design. Open-loop and closed-loop control; system stability; analogue and digital control.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 20% continuous assessment, 80% examination

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**IMSE2005. Managerial accounting and finance (6 credits)**

Cost accounting - procedures; direct costs, absorption costing; marginal costing. Planning and control - budgetary planning systems; standard costing systems; capital expenditure and investment; health, safety and environmental aspects of company activities; contemporary issues in management accounting; financial accounting - accounting rules; basic financial accounts; manufacturing accounts; company account; financial performance - cash flow statements; interpretation of accounting data.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE2009. Quality management (6 credits)**

Total quality management; management tools for quality; benchmarking; quality assurance management systems; ISO9000 series; national quality awards; design of industrial experiments; statistical process control; control charts; acceptance sampling; environmental management; ISO14000 series; environmental management systems; business process reengineering; customer services quality.

Assessment: 30% continuous assessment, 70% examination

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**IMSE2016. Internet technology for e-commerce (6 credits)**

Overview of E-Business and E-Commerce: Electronic Business Solutions (EBS), 3-tiered architecture, EBS technologies; Business Models: Their new dimensions and impacts, types and choice; Design and development: user requirement analysis, system development paradigms, structured system development and object-oriented system development methods. Adoption and Implementation: internet programming, web-based system development, online database design and implementation, case studies and mini-project.

Assessment: 60% continuous assessment, 40% examination

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**IMSE2018. Industrial organisation and management (6 credits)**

Managing and managers; evolution of management theory; planning - decision making; strategic management; strategy implementation, industrial marketing strategies; organising - organisational design and structure; power and the distribution of authority; managing organisational change and innovation; leading – motivation, leadership, teams and teamwork; communication and negotiation; controlling, principles of effective control, operations control.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE2019. Stochastic decision systems (6 credits)**

Decision analysis: decision making under uncertainty, axioms of decision analysis, methodology of decision analysis, analytical hierarchy approach, quantification of judgmental uncertainties, assessing utilities, and group decision problems; game theory and gaming: extensive and normal forms, zero-sum two-person games, two-persons nonzero-sum games, n-persons games, teaching and training and operational gaming; stochastic processes: random walks, recurrent events, Markov chains, and renewal-processes.

Prerequisite: ENGG1003 Mathematics I, or ENGG1004 Mathematics IA and IMSE1018 Mathematics (IMSE)
Assessment: 30% continuous assessment, 70% examination

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**IMSE2020. Purchasing and supply management (6 credits)**

Introduction of purchasing function/process; quality management for goods and service; sourcing and market analysis; make-or-buy decisions and subcontracting ; negotiation; controlling price and costs; vendor selection; commodity buying; service buying; capital buying; strategic purchasing; e-procurement and public procurement

Assessment: 40% continuous assessment, 60% examination

**IMSE2027. Facilities planning and design (6 credits)**

Plant location problem; advanced techniques in plant layout design, computer-based layout planning, and quantitative approaches; materials handling, storage and warehousing for global manufacturing; lean manufacturing, cellular manufacturing, one-piece flow; workplace design in the information age; digital factory; fire safety and security; study cases drawn from the manufacturing and service industries.

Assessment: 30% continuous assessment, 70% examination

**IMSE2028. Human factors engineering (6 credits)**

Human-organization interaction; human-machine interface usability and design; workplace safety and health; applied anthropometry and biomechanics; physical work and manual material handling; workplace and environmental design, illumination, noise, thermal; information processing; display and control; skills and learning; job design and shift work.

Assessment: 20% continuous assessment, 80% examination

**B. Common Core Curriculum Courses (12 credits)**

**C. Internship**

**IMSE2029. Internship (6 credits)**

A minimum of six week summer internship in the industry.

Assessment: 100% practical work

**Level Three**

**A1. Core Engineering Courses**

**IMSE3016. Operations planning and control (6 credits)**

The use of operations planning and control systems in forecasting, scheduling and inventory control; functions and organisation of production and inventory control systems; demand forecasting; deterministic and stochastic inventory control problems; aggregate production planning; master production scheduling; requirements and capacity planning systems; operations scheduling and control of production systems; Just-In-Time techniques; balancing of assembly lines; information reporting and processing; supply chain management.

Prerequisite: IMSE2008 Operational research techniques
Assessment: 20% continuous assessment, 80% examination

**IMSE3022. Global logistics systems (6 credits)**

Global operations and logistics strategies, strategic changes required by globalisation, the strategic framework for integrating global operations, the role of logistics in global operations and marketing strategies; global operations and logistics planning, supplier network development, physical distribution, global logistics network design, global supply chain management, foreign exchange risk management in global operations; operations analysis of global supply chains, information management for global logistics, performance measurement and evaluation in global logistics.

Prerequisite: IMSE1016 Fundamentals of business logistics
Assessment: 20% continuous assessment, 80% examination

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**Technical project**

**IMSE3024. Project (12 credits)**

A dissertation or report on a topic consisting of design, experimental or analytical investigation in the field of logistics engineering and supply chain management.

Assessment: 100% continuous assessment

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**Integrative project**

**IMSE3025. Logistics systems integration (6 credits)**

Student-centred learning on system integration and analysis and evaluation of logistics system performance. The module is based on case studies and covers the application of various techniques as follows:

Facility location analysis; network planning process; warehouse design and management; logistics information management; supply chain performance analysis; alternative supply chain strategies; vehicle routing and scheduling; systems modelling and simulation; customer-supplier relationship; international transportation strategies.

Assessment: 100% continuous assessment

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**A2. Discipline Elective Courses**

**For the syllabuses of Discipline Elective Courses with the code IMSE1XXX and IMSE2XXX, please refer to the previous section Level 2 A2.**

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**IMSE3001. Computer integrated manufacturing (6 credits)**

Overview of Computer Integrated Manufacturing (CIM) system and CAD/CAM functions; geometric modelling in CAD - principles of surface and solid modelling; CNC applications in CAM; computer aided process planning, automated process planning; rapid and virtual manufacturing; CAD and CAM

integration.

Prerequisite: IMSE1009 Fundamentals of Engineering Design
Assessment: 30% continuous assessment, 70% examination

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**IMSE3002. Engineering project management (6 credits)**

Fundamentals of engineering project management; project environment; project evaluation; risk management process; project selection and proposal preparation; project scheduling and contingency setting and control; control of variation and claims; project management methodologies and techniques, change management; multi-criteria decision making process; analytic hierarchy process; PERT/GANTT techniques for project control and resources allocation; simulation of critical paths; case studies.

Co-requisite: IMSE2008 Operational research techniques
Assessment: 30% continuous assessment, 70% examination

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**IMSE3010. Financial engineering (6 credits)**

Financial markets and financial securities, portfolio management and investment strategies; international finance, foreign exchange markets; project evaluation and financing, present value, cost of capital, cost-benefit ratio and internal rates of return; financial instruments, forwards, futures; swaps, options and hedging strategies; foreign trade and investment in China.

Prerequisite: IMSE2005 Managerial accounting and finance
Assessment: 30% continuous assessment, 70% examination

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**IMSE3019. Digital enterprises and e-commerce (6 credits)**

Enterprise resource management; EDI applications; data mining and warehousing; virtual enterprises; advanced Internet and web applications in product development, industrial applications of virtual reality; electronic product and component cataloguing; cryptographic systems; capability maturity model; social accountability standard; E-commerce business models; technological, business planning and social issues of E-commerce; order taking and processing; electronic payment systems, smart cards.

Prerequisite: IMSE2016 Internet technology for e-commerce, or IMSE1013 Introduction to information systems, or IMSE1008 Computer applications for engineers, or ENGG1002 Computer programming and applications, or ENGG1013 Computer programming and applications IA and ENGG1014 Computer programming and applications IB, or ENGG1016 Computer programming and applications I
Assessment: 40% continuous assessment, 60% examination

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**IMSE3020. Technology marketing (6 credits)**

Customer relationships and value, marketing strategies and plans, marketing environment, ethical and social responsibility in marketing, marketing mix, marketing research and forecasting, marketing segmentation and positioning, technology trend, distribution channels, intellectual property, e-marketing.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE3021. Strategic management of business and technology (6 credits)**

Analysis of the external environment and industry clusters for local industries – threats and opportunities from government policies as well as the legal, economic, social and technological environment; competitive forces from industry rivals, customers and other sources; analysis of internal weaknesses and strengths – resources, competences and success factors; mission and strategic intent; strategic directions and methods – conditions and implications; implementing and evaluating strategic changes; management for technology innovation.

Prerequisite: IMSE1003 Introduction to business and management
Assessment: 30% continuous assessment, 70% examination

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**IMSE3023. Warehousing and terminal operations (6 credits)**

Introduction to warehousing; material handling technologies, MH principles, container and unitizing equipment, storage and retrieval equipment, AS/RS, material transport equipment, automatic data collection and communication equipment, packaging; warehouse management system, receiving, cycle counting, order processing, picking, replenishment, shipping; warehouse planning and design: simulation model and software; design procedures.
Introduction to container terminal and air cargo terminal, basic operation flow at ship, quay, container yard, gate and CFS, container handling equipment and operation modes organization structure of a terminal and it various functions, container ship structure and generations, terminal management system, terminal planning and design methodology and analysis tools.

Prerequisite: IMSE1016 Fundamentals of business logistics
Assessment: 30% continuous assessment, 70% examination

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**IMSE3028. Innovation and entrepreneurship (6 credits)**

Entrepreneurship in the new world economy, developments in the pacific region and greater China; general characteristics of entrepreneurs; enterprise formation, organizational structure, new economy business models; enterprise resources, business plan, venture capital; technological growth; environmental and contingency factors; case studies. Skill workshops: identifying strengths and improving skills; organising yourself and your time; communication; systematic problem solving; group work; negotiating and assertiveness; coping with pressure; leadership.

Assessment: 30% continuous assessment an 70% examination

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**DOUBLE-DEGREES IN BENG/BBA OPTION**
(Applicable to students admitted in the academic year 2010-11 and thereafter)

Candidates are given an option to pursue the double-degrees in BEng/BBA, subject to the approval of the Boards of the Faculty of Engineering and Faculty of Business and Economics upon their meeting the

prescribed admission requirements as laid down by both the Faculty of Engineering and the Faculty of Business and Economics.

Candidates who have satisfied all the requirements of the BEng curriculum will be awarded the degree of Bachelor of Engineering. The BEng(LESCM) curriculum under the double-degrees in BEng/BBA option is as follows:

**Exemptions**

Candidates who have taken and passed the courses BUSI1007 (Principles of Management) and BUSI0027 (Management accounting I) under the double-degrees in BEng/BBA option are automatically granted exemption for the courses IMSE1003 (Introduction to business and management), IMSE2005 (Managerial accounting and finance) and IMSE3021 (Strategic management of business and technology).

**First Year**

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1009 | Fundamentals of engineering design | 6 | 1 | Introductory |
| IMSE1016 | Fundamentals of business logistics | 6 | 1 | Introductory |
| ENGG1003 | Mathematics I | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1004 | Mathematics IA | 3 | 1 | N/A |
| IMSE1018 | Mathematics (IMSE) | 3 | 1 | N/A |
| ENGG1002 | Computer programming and applications | 6 | 1 | N/A |
| **OR** | | | | |
| ENGG1016 | Computer programming and applications I | 6 | 1&2 | N/A |
| Credits required: 24 | | | | |

| General Engineering Courses | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| ENGG1009 | Industrial management and logistics | 6 | 1 |
| ENGG1006 | Engineering for sustainable development | 6 | 1 |
| ENGG1007 | Foundations of computer science | 6 | 1 |
| ENGG1011 | Introduction to biomedical engineering | 6 | 1 |
| ENGG1015 | Introduction to electrical and electronic engineering | 6 | 1 |
| ENGG1018 | Introduction to mechanical engineering | 6 | 1 |
| Select two courses from the above General Engineering Courses; credits required: 12 | | | |

| Language Enhancement Courses | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| CAES1907 | Business Communication | 3 | 1 |
| CAES1515 | Professional and technical oral communication for engineers | 3 | 1 |
| CENG1001 | Practical Chinese language course for engineering students | 3 | 1 |
| Credits required: 9 | | | |

| Common Core Courses | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |

| | | | |
|---|---|---|---|
| | Common Core Course | 6 | 1 |
| | Common Core Course | 6 | 1 |
| Credits required: 12 | | | |

**Second Year**

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1021 | Engineering training | 6 | summer | Introductory |
| IMSE0201 | Supply chain design and development | 6 | 1 | Advanced |
| IMSE2008 | Operational research techniques | 6 | 1 | Advanced |
| IMSE2009 | Quality management | 6 | 1 | Advanced |
| IMSE2016 | Internet technology for e-commerce | 6 | 1 | Advanced |
| IMSE2021 | Transportation and distribution planning | 6 | 1 | Advanced |
| IMSE2024 | Mathematics II | 6 | 1 | Advanced |
| IMSE2026 | Engineers in society | 6 | 1 | Advanced |
| IMSE2035 | Integrative studies (LSC practice) – Project | 6 | 1 | Advanced |
| Credits required: 54 | | | | |

**Third Year**

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE2029 | Internship | 6 | summer | Advanced |
| IMSE3002 | Engineering project management | 6 | 1 | Advanced |
| IMSE3016 | Operations planning and control | 6 | 1 | Advanced |
| IMSE3022 | Global logistics systems | 6 | 1 | Advanced |
| IMSE3023 | Warehousing and terminal operations | 6 | 1 | Advanced |
| IMSE3024 | Project | 12 | 2 | Advanced |
| IMSE3025 | Logistics systems integration | 6 | 2 | Advanced |
| Credits required: 48 | | | | |

| Elective Course | | | |
|---|---|---|---|
| Code | Title | Credits | Length (Sem) |
| | (Any Elective course) | 3 | 1 |
| Credits required: 3 | | | |

*Note: Candidates can refer to the previous sections for further information on the prerequisite relationship and course syllabuses of the above-listed courses.*

To be eligible for proceeding to the BBA programme in the 4th year, candidates must (1) fulfil the requirements of the BEng curriculum; and (2) pass the 54 credits of courses, as listed below, as required by the Faculty of Business and Economics during their study for BEng:

| **Course Code** | **Course** | **Credits** |
|---|---|---|
| BUSI1002 | Introduction to accounting | 6 |
| BUSI1003 | Introduction to management information systems | 6 |

| | | |
|---|---|---|
| BUSI1004 | Marketing | 6 |
| BUSI1007 | Principles of management | 6 |
| ECON1001 | Introduction to economics I | 6 |
| FINA1003 | Corporate finance | 6 |
| BUSI0027 | Management accounting I | 6 |
| | Electives (Any 2 courses in Finance, HRM or Marketing major) | 12 |
| | ***Total*** | ***54*** |

Subject to approval of the Board of the Faculty of Engineering, candidates who have completed the requirements of BEng and decide not to proceed to the study for BBA may be awarded with a minor as specified by the Faculty of Business and Economics, if they have completed not less than 36 credits of courses in compliance with the syllabuses for the minor programme.

To obtain the degree of BBA, candidates must satisfactorily complete 114 credits of courses, 54 of which shall be completed during the study for BEng and 60 of which shall be completed during the 4th year in accordance with the Regulations and Syllabuses for the Degree of BBA in Conjunction with the Degree of BEng.

*Note: Further details about the length and content of the courses listed may be obtained on application to the department concerned.*

**MINOR OPTION - LOGISTICS ENGINEERING AND SUPPLY CHAIN MANAGEMENT**
(Applicable to students admitted in the academic year 2010-11 and thereafter)
(Candidates enrolled in BEng degree curriculum with specialism in either Industrial Engineering and Technology Management or Logistics Engineering and Supply Chain Management are NOT eligible to choose this Minor Option.)

Candidates are given an option to pursue the minor in Logistics Engineering and Supply Chain Management, subject to approval of the Head of Department concerned. Candidates who wish to have their minor recorded on the transcript must take and pass all the required courses listed below in addition to the graduation requirements of their own degree curriculum:

| Core Engineering Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE1029 | Logistics systems modeling and simulation | 6 | 1 | Introductory |
| IMSE0201 | Supply chain design and development | 6 | 1 | Advanced |
| Credits required: 12 | | | | |

| Discipline Elective Courses | | | | |
|---|---|---|---|---|
| Code | Title | Credits | Length (Sem) | Major Course Level |
| IMSE2005 | Managerial accounting and finance | 6 | 1 | Advanced |
| IMSE2008 | Operational research techniques | 6 | 1 | Advanced |
| IMSE2021 | Transportation and distribution planning | 6 | 1 | Advanced |
| IMSE2026 | Engineers in society | 6 | 1 | Advanced |
| IMSE3019 | Digital enterprises and e-commerce | 6 | 1 | Advanced |
| Select 4 courses from the above Discipline Elective Courses; credits required: 24 | | | | |