Assessment plan Bachelor Industrial Engineering and Management (IEM) 2022-2023

Introduction

This assessment plan is a systematic description of the type of assessment used in the various modules of the Bachelor's Degree Programme Industrial Engineering and Management. This assessment plan fits within the assessment policy of the Faculty of Science and Engineering 1, and the protocol used by the Board of Examiners of the degree programme 2.

The assessment plan is based on:

1. The (appendices of the) Teaching and Examination regulations of the degree programme;
2. The description of the various modules of the degree programme in the digital course catalogue *Ocasys*, including:
   - Objective of the module;
   - Course content;
   - Lecturers and examiners;
   - Assessment method used;
   - Lecture format.

Assessment plan

The assessment plan contains the following items:

1. Mission and objectives of the degree programme
2. Learning outcomes of the degree programme
3. An overview of examiners and assessment type used for all modules in the IEM master's programme. The following types of assessments are distinguished in this scheme:
   - *Examples of assessment modes include:*
   - *Written exam with open questions (WE)*
   - *Written exam with multiple-choice questions (MC)*
   - *Oral exam (OR)*
   - *Report (R)*
   - *Presentation (P)*
   - *Interim test (IT)*
   - *Assignment (AST)*
   - *Practical work (PR)*
4. A list of lecturers qualified to supervise IEM Bachelor's Thesis.
5. A matrix describing the relation between the various modules of the programme and the specified learning outcomes of the degree programme. The specified learning outcomes have been described in the Critical Reflection (2016) of the Bachelor's degree programme Industrial Engineering and Management.

1 FSE Quality Assurance Manual, 2018-2019; https://myuniversity.rug.nl/infonet/medewerkers/fse/education/policy-quality-education/documents/quality-assurance-manual-fse.pdf

2 Protocol for the duties and powers of the Board of Examiners of the Faculty of Science and Engineering (2014) https://myuniversity.rug.nl/infonet/medewerkers/fse/education/policy-quality-education/documents/fmns-protocol-board-of-examiners.pdf

Mission and objectives of the degree programme
The mission of the Industrial Engineering and Management bachelor's degree programme is "to educate industrial engineers who innovate with technological solutions for managerial/business problems".

This mission is translated into the following objectives of the Bachelor's degree program Industrial Engineering and Management:

1. The programme aims to teach students the knowledge, skills and understanding in the field of industrial engineering and management to (re)design (elementary) technological processes and products in a managerial/business context, i.e. including implementation of the (re)design and evaluation of the implementation.
2. The programme aims to prepare students in terms of knowledge, skills and understanding, to pursue an appropriate Master's degree programme, especially a master's degree programme in Industrial Engineering and Management
3. The programme aims to give students an academic training with respect to:
   - Autonomous critical thinking and acting;
   - Scientific communication in English.

Learning outcomes of the Bachelor's degree programme Industrial Engineering and Management
Holders of a Bachelor's degree in Industrial Engineering and Management have:
1. The required knowledge to describe elementary technological products and processes within a business context.
2. The required understanding to determine and assess the functionality and performance of these products and processes in a multidisciplinary way (e.g. from technological and business perspectives as well as those of a variety of stakeholders).
3. The required skills to design, redesign, implement and subsequently validate these products and processes.
4. The required knowledge, understanding and skills for 'Life-Long Learning' (including finding information and using IT applications) to function largely autonomously.
5. The required knowledge and understanding of technology, business studies, mathematics and natural sciences to successfully complete a Master's degree programme in Industrial Engineering.
6. An academic attitude, i.e. the required knowledge, understanding and skills to conduct elementary academic research.
7. The required skills to communicate effectively about ideas and solutions with both engineers and managers.
8. Basic knowledge in the field of leadership, socially and ethically responsible behaviour in order to apply technology.

Examiners and assessment type of modules in the degree programme

Year 1 - Propaedeutic phase (60 ECTS)

Module	ECTS	Course coordinator/ First examiner	Second examiner	Examination type
Calculus 1 (for IEM) (WBIE003-05)	5	dr. A.M.S. Waters	dr. ir. R. Luppes	MC, WE
Global Supply Chain (WBIE005-05)	5	dr. ing. A. Hübl	dr. W.M.C. van Wezel	AST, P, PR, R
Programming, Modelling and Simulation (WBIE008-05)	5	G.K.H. Larsen, PhD	M. Taheri, PhD	AST, PR, R, WE
Linear Algebra (for IEM) (WBIE009-05)	5	P.M.J. Tibboel, PhD	prof. dr. S. Trenn	AST, IT, P, PR, WE
Organizational Behaviour and Group Dynamics (WBIE012-05)	5	dr. T.A. de Vries	dr. M.P. van der Steen	AST, WE
System Dynamics (WBIE016-05)	5	ir. T.M. Kousemaker	dr. ing. A. Hübl	AST, WE
Calculus 2 (for IEM) (WBIE017-05)	5	P.M.J. Tibboel, PhD	dr. ir. R. Luppes	WE
Management Accounting (WBIE022-05)	5	dr. M.P. van der Steen	dr. ir. G.H. Jonker	MC, P, R
Materials and Molecules (WBIE023-05)	5	*TBD*	prof. dr. M.M.G. Kamperman	AST, MC, WE
Fluid Dynamics (WBIE004-05)	5	dr. D. Parisi	prof. dr. F. Picchioni	AST, WE
Industrial Marketing (WBIE050-05)	5	M.R. Padigar, PhD	dr. ir. G.H. Jonker	AST, WE
Statistics and Stochastics (WBIE041-05)	5	dr. Tsega Kahsay Gebretekle	dr. W.P. Krijnen	AST, WE

Year 2 - PTL track (60 ECTS)

Module	ECTS	Course coordinator/ First examiner	Second examiner	Examination type
Fluid Dynamics (WBIE004-05)	5	dr. D. Parisi	prof. dr. F. Picchioni	AST, WE
Operations Research (WBIE007-05)	5	dr. N. Monshizadeh Naini	prof. dr. C. De Persis	WE
Outlining and implementing innovation strategy (WBIE013-05)	5	prof. dr. P.M.M. de Faria	prof. dr. F. Noseleit	AST, WE
Production Planning and Quality Control (WBIE014-05)	5	dr. W.M.C. van Wezel	ir. T.M. Kousemaker	AST, IT, WE
Research and Design Methodology (WBIE015-05)	5	M. Muñoz Arias, PhD	dr. ir. G.H. Jonker	MC, OE, PR, R
Sustainable Engineering Design (WBIE052-05)	5	dr. ir. G.H. Jonker	G.K.H. Larsen, PhD	IT, R, WE
Mechanics for IEM (WBIE024-05)	5	prof. dr. A. Vakis	S. Solhjoo, PhD	WE
Modelling and analysis of complex networks (WBIE025-05)	5	prof. dr. ir. M. Cao	prof. dr. ir. B. Jayawardhana	P, R, WE
Signals and Systems (WBIE030-05)	5	prof. dr. ir. B. Jayawardhana	prof. dr. ir. J.M.A. Scherpen	PR, WE

Computer Aided Design and Manufacturing (WBIE033-05)	5	M.I. Acuautla Meneses, PhD	dr. ir. A.A. Geertsema	AST, P, PR, R
Control Engineering (WBIE034-05)	5	prof. dr. C. De Persis	dr. N. Monshizadeh Naini	IT, PR, WE
Production Techniques (WBIE040-05)	5	prof. dr. Y. Pei	dr. ir. A.A. Geertsema	AST, IT, PR, WE

Year 2 - SPE track (60 ECTS)

Module	**ECTS**	**Course coordinator/ First examiner**	**Second examiner**	**Examination type**
Fluid Dynamics (WBIE004-05)	5	dr. D. Parisi	prof. dr. F. Picchioni	AST, WE
Operations Research (WBIE007-05)	5	dr. N. Monshizadeh Naini	prof. dr. C. De Persis	WE
Outlining and implementing innovation strategy (WBIE013-05)	5	prof. dr. P.M.M. de Faria	prof. dr. F. Noseleit	AST, WE
Production Planning and Quality Control (WBIE014-05)	5	dr. W.M.C. van Wezel	ir. T.M. Kousemaker	AST, IT, WE
Research and Design Methodology (WBIE015-05)	5	M. Muñoz Arias, PhD	dr. ir. G.H. Jonker	MC, OE, PR, R
Sustainable Engineering Design (WBIE052-05)	5	dr. ir. G.H. Jonker	G.K.H. Larsen, PhD	IT, R, WE
Industrial Biotechnology (for IEM) (WBIE051-05)	5	prof. dr. M.J.E.C. van der Maarel	prof. dr. G.J.W. Euverink	PR, WE, R
Reactor Engineering (WBIE029-05)	5	dr. C.L. Tucker	dr. ir. J.G.M. Winkelman	AST, WE
Technical Thermodynamics (IEM) (WBIE031-05)	5	dr. ir. J.G.M. Winkelman	prof. dr. F. Picchioni	WE
Gas-Liquid Mass Transfer (WBIE036-05)	5	dr. ir. J.G.M. Winkelman	prof. dr. ir. G.F. Versteeg	WE
Process Design and Equipment (WBIE039-05)	5	dr. P. Karka	dr. ir. G.H. Jonker	AST, R, WE
Transport Phenomena 2 (WBIE042-05)	5	dr. ir. P.D. Druetta	dr. ir. G.H. Jonker	AST, R, WE

Year 3, semester 1 - Specialization package PTL (30 ECTS)

Module	**ECTS**	**Course coordinator/ First examiner**	**Second examiner**	**Examination type**
Nanoscience and Nanotechnology (WBIE045-05)	5	dr. A.G.P. Kottapalli	prof. dr. Y. Pei	IT, WE
Numerical Methods (for IEM) (WBIE049-05)	5	dr. ir. R. Luppes	prof. dr. C.A. Bertoglio	PR, WE
Entrepreneurship for Engineers (WBIE047-05)	5	dr. A.J. Frederiks	dr. W.G. Biemans	AST, WE
Mechatronics (WBIE011-05)	5	prof. dr. ir. J.M.A. Scherpen	prof. dr. ir. B. Jayawardhana	IT, PR, WE
Principles of Measurement Systems (WBPH029-05)	5	dr. A.K. Biegun	dr. J.S. Blijleven	AST, WE
Optional management module FEB	5	Various		Various

Year 3, semester 1 - Specialization package SPE (30 ECTS)

Module	ECTS	Course coordinator/ First examiner	Second examiner	Examination type
Circular Economy for Process Industry (WBIE053-10)	10	dr. P. Karka	dr. ir. G.H. Jonker	AST, P, R
Chemical Process Development and Design (WBCE007-05)	5	prof. dr. ir. G.F. Versteeg	-	R
Entrepreneurship for Engineers (WBIE047-05)	5	dr. A.J. Frederiks	dr. W.G. Biemans	AST, WE
Optional management module FEB	5	Various		Various

Year 3, semester 1 - Specialization package ME (30 ECTS)

Module	ECTS	Course coordinator/ First examiner	Second examiner	Examination type
Dynamics and Vibrations (WBIE054-05)	5	prof. dr. M. Ghandchi Tehrani	prof. dr. ir. B. Jayawardhana	WE
Numerical Methods (for IEM) (WBIE049-05)	5	dr. ir. R. Luppes	dr. ir. J.P.M. Beijers	AST, WE
Solid Mechanics (for IEM) (WBIE055-05)	5	F. Maresca, PhD	*TBD*	AST, WE
Materials Science (WBPH020-05)	5	dr. ir. V. Ocelik	prof. dr. ir. B.J. Kooi	AST, PR. WE
Mechatronics (WBIE011-05)	5	prof. dr. ir. J.M.A. Scherpen	prof. dr. ir. B. Jayawardhana	PR, WE
Principles of Measurement Systems (WBPH029-05)	5	dr. A.K. Biegun	dr. J.S. Blijleven	WE

Optional management modules Faculty of Economics and Business – specialization packages both tracks

Module	ECTS	Course coordinator/ First examiner	Examination type
Digital Transformation in IB (EBB632B05)	5	dr. E. Smailhodzic	AST, WE
Macroeconomics for EOR (EBB027B05)	5	dr. G.H. Kuper	AST, WE
Health Economics (EBB120A05)	5	L. Viluma, PhD	WE
Junior Business Research and Consulting (EBB123A05)	5	prof. dr. J. Riezebos	AST
Finance and Risk Management for IB (EBB631B05)	5	dr. H. Gonenc	AST, MC, WE
Teamwork - Theories, Design and Dynamics (EBB110A05)	5	dr. H.J. van de Brake	ASR, MC, WE
Purchasing & Supply Chain Management (EBB742B05)	5	dr. ir. S. Boscari	AS, WE

Year 3, semester 2 PTL track (30 ECTS)

Module	ECTS	Course coordinator/ First examiner	Second examiner	Examination type
Design Science (WBIE019-05)	5	M. Taheri, PhD	dr. ir. G.H. Jonker	AST, P, R
Integration Project IEM (PTL) (WBIE902-15)	15	G.K.H. Larsen, PhD	various	PR, P, R
Design and Construction for IEM (WBIE047-05)	5	M.Mohebbi, MSc	dr. ir. A.A. Geertsema	AST, WE

Materials Selection for Engineering Design (WBIE044-05)	5	dr. D. Ribas Gomes	prof. dr. Y. Pei	AST, R

Year 3, semester 2 SPE track (30 ECTS)

Module	**ECTS**	**Course coordinator/ First examiner**	**Second examiner**	**Examination type**
Design Science (WBIE019-05)	5	M. Taheri, PhD	dr. ir. G.H. Jonker	AST, P, R
Integration Project IEM (SPE) (WBIE901-15)	15	G.K.H. Larsen, PhD	Various	PR, P, R
Capita Selecta SPE (WBIE046-05)	5	dr. D. Parisi	prof. dr. F. Picchioni	AST
Product Technology (IEM) (WBIE028-05)	5	prof. dr. F. Picchioni	R.K. Bose, PhD	AST, WE

List of Integration Project supervisors

Title	Initials	Last Name	Research group/ Department	Research Institute	UTQ*
prof. dr.	D.	Bauso	Optimization and Decision Systems	ENTEG	
dr.	R.M.J.	Benders	Energy and Environment		
dr.	A.J.	Bosch	Design group		Yes
prof. dr. ir.	M.	Cao	Discrete Technology and Production Automation	ENTEG	Yes
dr.	A.K.	Cherukuri	Optimization and Decision Systems	ENTEG	
prof. dr.	C.	De Persis	Smart Manufacturing Systems	ENTEG	Yes
dr.	P.L.	Deuss	Chemical Technology	ENTEG	
Prof. dr. ir.	M. van	Duin	Product Technology	ENTEG	
prof. dr.	G.J.W.	Euverink	Products and Processes for Biotechnology	ENTEG	Yes
dr. ir.	A.A.	Geertsema	Design group		
prof. dr. ir.	H.J.	Heeres	Chemical Technology	ENTEG	Yes
dr.	W.L.J.	Hinrichs	Pharmaceutical Technology and Biopharmacy	GRIP	
dr.	A	Hübl	Design Group		
prof. dr.	B.	Jayawardhana	Discrete Technology and Production Automation	ENTEG	Yes
dr. ir.	G.H.	Jonker	Design group		Yes
dr. ing.	H.	Kloosterman	Design group		
prof. dr. ir.	B.J.	Kooi	Nanostructured Materials and Interfaces	ZIAM	Yes
dr.	A.G.P.	Kottapalli	Advanced Production Engineering	ENTEG	
dr.	W.P.	Krijnen	Undergraduate school of Science		Yes
dr.	J.	Krooneman	Products and Processes for Biotechnology	ENTEG	Yes
dr.	A.O.	Krushynska	Computational Mechanical and Materials Engineering	ENTEG	
dr.	G.	Lange, de		ESRON	
PhD	G.K.H.	Larsen	Design Group		
prof. dr.	M.J.E.C.	Maarel, van der	Aquatic Biotechnology and Bioproduct- technology	ENTEG	Yes
PhD	F.	Maresca	Computational Mechanical and Materials Engineering	ENTEG	
Msc	M.	Mohebbi	Design Group		
dr.	N.	Monshizadeh Naini	Smart Manufacturing Systems	ENTEG	
dr.	M.	Muñoz Arias	Computational Physics	ZIAM	
prof. dr. ir.	P.R.	Onck	Micromechanics	ZIAM	Yes
prof. dr.	Y.	Pei	Advanced Production Engineering	ENTEG	Yes
dr.	P.P.	Pescarmona	Product Technology	ENTEG	Yes
prof. dr.	F.	Picchioni	Product Technology	ENTEG	Yes
prof. dr. ir.	J.	Post	Advanced Production Engineering	ENTEG	
drs.	W.A.	Prins	Advanced Production Engineering	ENTEG	
dr.	P.	Raffa	Product Technology	ENTEG	
prof. dr.	J.	Riezebos	FEB Operations	SOM	
prof. dr.	A.J.	Schaft, van der	Systems, Control and Applied Analysis	JBI	
prof. dr. ir.	J.M.A.	Scherpen	Discrete Technology and Production Automation	ENTEG	Yes

dr.	R.	Smedinga	Software Engineering	JBI	Yes
dr.	N.B.	Szirbik	FEB Operations	SOM	Yes
PhD	M.	Taheri	Design Group		
dr.	A.	Vakis	Advanced Production Engineering	ENTEG	Yes
prof. dr. ir.	G.J.	Verkerke	FMS Rehabilitation-General		
prof. dr. ir.	G.F.	Versteeg	Applied Chemistry	ENTEG	
prof. dr .ir.	K.	Voort Maarschalk, van der	Pharmaceutical Technology and Biopharmacy	GRIP	progress
dr.	W.M.C.	Wezel, van	FEB Operations	SOM	Yes
dr. ir.	J.G.M.	Winkelman	Chemical Technology	ENTEG	
dr.	J.	Yue	Chemical Technology	ENTEG	Yes

*UTQ = University Teaching Qualification
NB UTQ status has been requested at the PIE team. Due to their holidays, we do not have this information at the moment.

Relation between the learning outcomes and course units of the curriculum
From the second year there are two tracks within the Bachelor's degree programme IEM: Production Technology and Logistics (PTL) and Sustainable Process Engineering (SPE). In order to specify the learning outcomes of the programme for these tracks, we distinguish four competence areas (general academic skills are assimilated into these competence areas).

General competence area's (applicable for all tracks):
N: Industrial engineering, mathematics, and natural sciences (outcomes 1, 4, 5, 6, 7)
M: Managerial and business sciences (outcomes 5,8)

Competence area per track:
T: Production Technology and Logistics (PTL) (outcomes 2, 3)
P: Sustainable Process Engineering (SPE) (outcomes 2, 3)

The specification of the learning outcomes of the programme for each competence area is as follows:

Industrial engineering, mathematics, and natural sciences (N)
In the area of engineering, mathematics, and natural sciences students have:
N1. Knowledge and understanding of (basic) concepts in mathematics, physics, chemistry and computing science
N2. Knowledge and understanding of (basic) design and engineering theories.
N3. Skills to apply mathematical, natural sciences and engineering concepts for solving (basic) theoretical and practical problems.
N4. Skills to apply mathematical, natural sciences and engineering concepts for solving (simulated) real-life engineering problems.
N5. Skills to justify and communicate about their problem solving approach from a multidisciplinary point of view.

Managerial and business science (M)
In the area of managerial and business sciences students have:
M1. Sufficient knowledge and understanding of managerial and business sciences to enter a master programme in Industrial Engineering (and related fields) according to ABET standards.
M2. Skills to choose and apply organizational (including information), psychological/social, financial, or marketing methods and concepts for solving basic theoretical and practical problems.
M3. Skills to choose and apply organizational (including information), psychological/social, financial, and/or marketing methods and concepts for adequately solving (simulated) real-life business problems.
M4. Skills to implement, justify, and communicate about their problem solving approach from a multidisciplinary point of view.

Production technology and logistics (T)
In the area of production technology and logistics students have:
T1. Basic knowledge and understanding of discrete product engineering, production technology and logistical engineering to enter master programs in Industrial Engineering and Management in discrete product engineering, production technology (of discrete products) and logistical engineering.
T2. Skills to analyse, (re)design, and implement (innovative) solutions for (elementary) discrete products and production system problems, taking into account realistic industrial constraints (economic, safety, manufacturability, sustainability etc.).
T3. Skills to effectively operate as junior employee (technologist, market analyst/developer, manager) in the discrete product engineering, production engineering and logistical engineering business; both at commercial production and support (services) level.

Sustainable Process Engineering (P)
In the area of product and process technology students have:
P1. Basic knowledge and understanding of (bio) chemical engineering, chemical product engineering and biotechnology to enter master programs in Industrial Engineering (chemical technology) and (Bio) Chemical Product Design and Engineering or Biotechnology according to EFCE standards.
P2. Skills to analyse (elementary) real-life industrial chemical process and product design problems and to develop (innovative) solutions on the basis of the scientific fundamentals used in these disciplines.
P3. Skills to effectively operate as junior employee (technologist, market analyst/developer, manager) in the chemical processing and production businesses; both at commercial production and support (services) level.

Propaedeutic phase	**N1** Mathematics and natural Sciences (K)	**N2** Design and engineering Theories (K)	**N3** Basic theoretical and practical problems (S)	**N4** Engineering problem solving (S)	**N5** Justify and communicate (S)	**M1** Management and business sciences (K)	**M2** Basic theoretical and practical problems (S)	**M3** Real-life problem solving (S)	**M4** Implement, justify and communicate (S)	**T1** Production technology and logistics (K)	**T2** Analysis. design & implement solutions (S)	**T3** Effectively operate in Business (S)	**P1** Chemical (product) engineering (K)	**P2** Analysis. design & implement solutions (S)	**P3** Effectively operate in Business (S)
Calculus 1 (for IEM)	X		X												
Global Supply Chain						X				X	X	X			
Programming, Modelling and Simulation	X			X	X										
Linear Algebra (for IEM)	X		X	X											
Organizational Behaviour and Group Dynamics						X	X	X	X						
System Dynamics			X			X	X	X	X						
Calculus 2 (for IEM)	X		X	X											
Management Accounting						X	X	X	X						
Materials and Molecules			X										X	X	X
Fluid Dynamics	X	X	X	X											
Industrial Marketing						X	X	X	X						
Statistics and Stochastics	X		X	X											

K =knowledge, S = Skills

Post-propaedeutic Year 2	**N1** Mathematics and natural Sciences (K)	**N2** Design and engineering Theories (K)	**N3** Basic theoretical and practical problems (S)	**N4** Engineering problem solving (S)	**N5** Justify and communicate (S)	**M1** Management and business sciences (K)	**M2** Basic theoretical and practical problems (S)	**M3** Real-life problem solving (S)	**M4** Implement, justify and communicate (S)	**T1** Production technology and logistics (K)	**T2** Analysis. design & implement solutions (S)	**T3** Effectively operate in Business (S)	**P1** Chemical (product) engineering (K)	**P2** Analysis. design & implement solutions (S)	**P3** Effectively operate in Business (S)
Fluid Dynamics	X	X	X	X											
Sustainable Engineering Design		X		X	X		X	X	X						
Operations Research	X					X	X	X							
Outlining and implementing innovation strategy					X	X	X	X				X			
Production Planning and Quality Control						X				X	X	X			
Research and Design Methodology					X	X	X	X	X						
Year 2 PTL specialization															
Mechanics for IEM	X	X	X	X						X	X				
Modelling and analysis of complex networks	X		X							X	X				
Signals and Systems	X	X	X	X											
Computer Aided Design and Manufacturing	X	X	X	X						X	X	X			
Control Engineering	X	X	X	X						X	X				
Production Techniques		X	X	X	X					X	X	X			
Year 2 SPE specialization															
Industrial Biotechnology (for IEM)				X	X								X	X	X
Reactor Engineering		X		X									X	X	X
Technical Thermodynamics (IEM)	X	X	X	X									X	X	
Gas-Liquid Mass Transfer	X	X	X	X									X	X	X
Process Design and Equipment													X	X	X
Transport Phenomena 2	X	X	X	X											

K =knowledge, S = Skills

Post-propaedeutic Year 3	**N1** Mathematics and natural Sciences (K)	**N2** Design and engineering Theories (K)	**N3** Basic theoretical and practical problems (S)	**N4** Engineering problem solving (S)	**N5** Justify and communicate (S)	**M1** Management and business sciences (K)	**M2** Basic theoretical and practical problems (S)	**M3** Real-life problem solving (S)	**M4** Implement, justify and communicate (S)	**T1** Production technology and logistics (K)	**T2** Analysis. design & implement solutions (S)	**T3** Effectively operate in Business (S)	**P1** Chemical (product) engineering (K)	**P2** Analysis. design & implement solutions (S)	**P3** Effectively operate in Business (S)
Year 3 PTL specialization															
Design Science					X	X	X	X	X						
Integration Project IEM (PTL)				X	X		X	X	X						
Design and Construction for IEM					X					X	X	X			
Materials Selection for Engineering Design										X	X	X			
Year 3 SPE specialization															
Design Science					X	X	X	X	X						
Integration Project IEM (SPE)				X	X		X	X	X						
Capita Selecta SPE													X	X	X
Product Technology (IEM)					X								X	X	X

K =knowledge, S = Skills