

Study and Examination Regulations (SER) Master of Engineering (M.Eng.) II

§ 1 Scope

The SER at hand regulates the Master studies in the area of

"Advanced Risk Technologies"

with the degree "Master of Engineering" (M.Eng.) and the regarding fields of specialization within the framework of the general study and examination regulations of SHB.

§ 2 Duration and Structure of the Program

- (1) The program is laid out as a residential program, supplemented by self-study and transfer periods.
- (2) Events, deadlines and locations as well as additional offers are specified in the respective student contract (inclusive study plan).
- (3) Duration and structure: As a general rule, the program takes 24 months, which students normally pass consecutively.

	min.-	days	hours/h	CP
a Modules (with compulsory attendance and transfer)		158	1.422	60
b Self-studies (recommended)		42	378	s.a.
c Project and thesis		200	1.800	60
Total study time		400	3.600	120

§ 3 Admissions Requirements, Modules, Load

- (1) The basic admission requirements are given in the general certification regulations. Specific admission requirements are given in Annex I.
- (2) Modules (based on the major subject) are specified in the SER's annex II.
- (3) Load (examinations and credit points, based on the major subject) is specified in the SER's annex II.

§ 4 Commencement

Date: 01.09.2009

Annex I: **SER M.Eng II**
Area: **Advanced Risk Technologies**
Major Subject: **Risk Engineering & Management (REM)**
Accreditaion: -

Determined by SHB's University Council and confirmed by the authorised administration of the Senate of Berlin the following specifications shall apply:

1. Duration:

No additional regulations.

2. Structure of the study plan

No additional regulations.

3. Special admissions requirements

3.1 Program:

31a Bachelor of Science or Engineering (with a minimum of 180 Credit Points), or an appropriate science degree deemed to be a satisfactory standard for the purpose of postgraduate admission and awarded by an institution recognized by SHB.

31b TOEFL, IELTS or similarly internationally recognized English language proficiency score.

31c Furthermore, admission tests may lead to a prescription of supplementary courses.

3.2 Modules: see profiles of the modules.

4. Modules: Definitions and annotations

4.1 Transfer:

41a Workload: see modules (courses) with transfer.

41b Workload: see modules (courses) with transfer. Based on the selection of the student and the decisions of the examination committee and documented in the study plan.

4.2 Basics:

-

4.3 Focus:

-

4.4 Optional compulsory:

44a Grade: One Grade with equal parts of K and PSA in the selected course.

CP: Added to the CP of the selected course.

4.5 Supplementation compulsory:

45a In case admission tests document a lack of prior education that potentially could lead to study failure or a lack of Credit Points, SHB reserves the right to prescribe individual study plans that would include supplementary courses. During the time of individual prestudies, students are preliminarily admitted to the program (academic preparations); after having finished these preliminary studies successfully, they are fully admitted to the program. During the time of studies, students are admitted to the program (additional courses).

4.6 Supplementation facultative:

46a Add-on courses, specified in the educational contract (compulsory for University Certificates).

46b In order to obtain the title of a **Risk Examiner**, the candidates must have at least 4 relevant courses and have at least 1 assisted case in the track subjects. The successful candidate should also participate in at least 1 application studies in 2 years after the exam. The certificate obtained is valid for 2 years.

46c In order to obtain the title of a **Senior Assessor**, the candidates must have the title Risk Examiner and at least 6 relevant courses and have at least 2 assisted and at least 1 lead case in one of the track subjects. The successful candidate should also participate in on-the-job-training and at least in 2 application studies in 2 years after the exam. The certificate obtained is valid for 3 years.

4.7 General annotations:

AI (All)	Annex I (Annex II)
AP	Oral master thesis defence (final exam)
Art	Type
C	Case
CP	Credit Point (ECTS, European Credit Transfer System, basis 30h/CP)
EF	Supplementation facultative
EPF	Supplementation compulsory
h	Hour (basis 9h/day)
K	Written examination
LNW	Examination
MT	Master thesis
Note	Grade
PA	Project work
PK	Project
PSA	Project Study Paper
S	Seminar (also as lecture/blended learning-unit/tutorial/workshops/colloquiums/etc. [cf. study plan])
SER	Study and Examination Regulations (Educational and Examination Regulations)
SL	Self-study
TA	Transfer paper
Tage	Days
TR	Transfer
VT	Major subject

5. Modules and Load

See annex II.

Anhang II: Module und Leistungen/Annex II: Modules and Load

Modul (Moduleile/Schwerpunkthinhalte) Module (Courses/Topics)	Tage			LNW		Gew. Note	CP			
	S	SL	TR	Art	h					
Risk Engineering & Management / major / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
VT: Risk Engineering & Management (REM)	*	*	*	*	*	120	120			
Risk Engineering & Management / transfer / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
PK1: Project (PK)	According to the admittance # cf. PK-modules			*	*	200	60			
Risk Engineering & Management / transfer / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
PK1.1: Transfer Papers (TA)	SPO: AI-41a			*	*	TA	*			
Risk Engineering & Management / transfer / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
PK1.2: Project Study Paper (PSA)	SPO: AI-41b			*	*	PSA	*			
Risk Engineering & Management / transfer / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
PK1.3: Project work (PA)	Basis for and documented in the thesis.			*	*	67	20			
Risk Engineering & Management / basics / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
PK1.4: Thesis	Scientific documentation, based on the project.			*	*	133	40			
Risk Engineering & Management / basics / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
I: Introduction, basics - risks in industry	*	15	6	*	*	*	6			
Risk Engineering & Management / basics / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
I-R1: INTRO: Introduction to Risk and Safety Management in Industry	General introduction to the topics of risks related to the general use of the chemicals by a modern society and related industrial sectors (chemical/process, oil & gas, power generation, heating, etc.). Hazards, related risks, and due legislative safety measures will be outlined considering acute (accidents) and chronic (pollution) risks within life cycle of chemicals (hazardous materials) and will be presented in units 1 and 2. Units 3 and 4 aim to provide introduction to major accidents prevention (EU legislative obligations) and related process safety risk assessment methodology. Where applicable, related EU directives are briefly mentioned.			5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / basics / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
I-R2: PETRO: Risk Analysis in Chemical/Petroleum Industries	The petroleum industry is changing rapidly, challenging many organizations and individuals to keep pace and distinguish opportunity from risk. Current global and regional happenings in the upstream, midstream, downstream and in petrochemical industries. It will increase understanding of the industry's strengths and weaknesses and the risk issues.			5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / basics / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
I-R3: POWER: Risk Analysis in Power Industries	Knowledge of risk analysis applied specifically in power industry, starting with advantages and effectiveness of its application. It presents the regulatory basis and requirements, and elaborate commonly used methods through number of examples.			5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
II: Asset/plant oriented risks management		15	6	6	*	*	*	9		
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
II-R4a: RBI-Petro: Risk Based Inspection - Petro	Principles of risk based inspection, existing approaches and gives links to applied codes and standards. The focus is given to API 581. Levels of analysis and usage of analysis results will be elaborated and illustrated with examples.			5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
II-R4b: RBI-Power: Risk Based Inspection - Power	The state-of-the art knowledge of risk based approaches currently applied in power generation industries to the wide range of professionals involved in different activities in conventional power generation.			5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
II-R5: RCM / RCFA: Reliability Centered Maintenance and Root Cause Failure Analysis	Reliability Centered Maintenance (RCM) and Root Cause Failure Analysis (RCFA) as methodologies used for logical decision-making process for analysis and definition of the equipment maintenance requirements, as well as for accident prevention. The focus of the course is on the damage mechanisms appearing in different industries. A large number of well elaborated examples is included.			5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
III: Hazard (consequence) oriented risks management	*	35	14	6	*	*	*	17		
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
III-R6: HSE / HSSE: Health, Safety, Security and	Overview of EU regulation in the field of HSE and HSSE (health, safety, security and environment), explain the objectives and requirements, explain state-of-the-art in application including constraint and advantages, and elaborate used techniques on a number of examples.			5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
III-R7: CoF: Accident and Consequences Modeling	General techniques for accident modeling and explains different models of explosion. It elaborates gas and vapor explosion, as well as gas dispersion modeling, using examples for applied methods. The course includes modeling of fire and presents current models.			5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies										
III-R8: FIRE: Fire protection	Theory of fire and extinguishment and explain sources of risk and fire protection installations. Through number of example fire protection measures in industry will be shown as well as legal background and requirements and applied safety concepts.			5	2	*	K [PSA]	1,5	3	2

Anhang II: Module und Leistungen/Annex II: Modules and Load

Modul (Moduleile/Schwerpunkthinhalte) Module (Courses/Topics)		Tage			LNW		Gew. Note	CP	
		S	SL	TR	Art	h			
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136479-									
III-R9:	ExP: Explosion protection	EU directive ATEX which is presented in details, along with the principles of explosion prevention and protection adopted in this directive. Its practical application in the industrial plants is explained on a series of real life examples.	5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136480-									
III-R10:	REACH: Risk analysis of chemicals	Principles of the EU regulation in the area of registration, evaluation and authorization of chemicals – REACH (EC Nr. 1907/2006). The course explains principles and obligations for manufacturers, importers and downstream users to ensure that they manufacture, place on the market or use such substances that do not adversely affect human health or the environment.	5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136481-									
III-R11:	ADR: Transport of dangerous materials	International and EU policies and legislative requirements related to the transport of dangerous materials and explains the European Agreement concerning the International Carriage of Dangerous Goods. It elaborates the main issues from ADR 2009 as well as safety measures and procedures in case of accidents.	5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136482-									
III-R12:	OSHA: Occupational Safety and Health	Regulations in the field of safety and health of workers at work. It will explain general principles concerning the prevention of occupational risks, the protection of safety and health, the elimination of risk and accident factors, the informing, consultation, balanced participation in accordance with national laws and/or practices and training of workers and their representatives, as well as general guidelines for the implementation of the said principles. The EU member states are obliged to integrate these matters into their national regulations. Where appropriate this is exemplified with regulations from Germany.	5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136483-									
IV:	Business/governance oriented risk management	*	40	16	12	*	*	*	21
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136484-									
IV-R13:	BUSINESS: Business continuity risks & insurance	Complement other courses devoted to technical and engineering issues of risk management in industrial plants (petrochemical plants, process industry, power plants, etc.). Technical risks in the above plants can be a cause or a contributing factor in/for the business continuity and the final outcome of the technical/engineering activities is practically always to be seen on the background of business implications and implications/impacts to the business activities of a company. The insurance aspects are the most relevant practical aspect linking the engineering and business side of the company operation and asset management: therefore these will be tackled, too.	5	2	*	K [PSA]	1,5	3	2
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136485-									
IV-R14:	iCSR & Sustainability: integrated Corporate Social Responsibility in industry	basic elements of the concept of Corporate (Social) Responsibility (CSR) and its practical application in industry. The course which focuses onto the following topics: <ul style="list-style-type: none"> • Key elements of the CSR and how these elements function as an integrated system • How CSR should be practically embedded into corporate and/or country business strategy and daily practice (CSR methodologies and tools) • The technology related aspects as a part of the modern practices of industry (HSE, HSSE) • Analysis/comparison of the practices in the EU, US and other countries • Relevant data and information on best practices worldwide, including a number of relevant case studies from the key industries and references to main sources of relevant data and information • Examples and projects using interactive and on-line course materials, also from external sources (e.g., the World Bank, GRI ...). A particular unit of the course is dedicated to new ISO 26000 standard.	5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136486-									
IV-R15:	Risk Governance: Risk Governance	Principles of modern risk governance including its main elements (ef. IRGC framework): a- pre-assessment, b- risk appraisal, c- risk characterization and evaluation d- risk management and e- risk communication. Apart from the general concept and the items to be considered under each of the elements (e.g. under "Risk Assessment": hazard identification and estimation, exposure and vulnerability assessment, risk estimation, risk perceptions, social concerns, socio-economic impacts) the examples from the industrial practice will be shown and explained. A separate part of the course will be dedicated to the overview of specific methods and techniques (e.g. Delphi), as well as to the tools and instruments facilitating the application by industry, governments and public bodies.	5	2	*	K [PSA]	1,5	3	2

Anhang II: Module und Leistungen/Annex II: Modules and Load

Modul (Moduleile/Schwerpunkthinhalte) Module (Courses/Topics)		Tage			LNW		Gew. Note	CP	
		S	SL	TR	Art	h			
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136487-									
IV-R16:	LCA: Life Cycle Analysis	Principles and practical application of the life cycle analysis (LCA) as a technique for accessing the environmental aspects and potential impacts associated with a product, by (a) compiling an inventory of relevant inputs and outputs of a product system, (b) evaluating the potential environmental impacts associated with those inputs and outputs, and (c) interpreting the results of the inventory analysis and impact assessment phases in relation with to the objective of the study. The course will provide overview of the techniques and the tools needed for the analysis, with practical examples from primarily from process industry and relevant products, covering the environmental aspects and potential impacts throughout a product's life (i.e. cradle-to-grave) from raw material acquisition through production, use and disposal, with a particular attention focused onto resource use, human health and ecological consequences.	5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136488-									
IV-R17:	EMERGING-RISKS	Issues of early recognition, classification and monitoring of emerging risks. As "emerging" are considered primarily risks previously not recognized as such, such as risks due to new processes, new technologies, new ways of working or social or organizational change (e.g. risks linked to nanotechnologies, bio-technology, new chemicals, outsourcing, globalization...). In addition also the known risks emerging due to the change in public perception or new scientific knowledge are considered. The methodology for to deal with these risks require new tools and these are presented at the course, concentrating in particular onto the use of concepts like UML (unified modeling language), indicators and modern IT tools, including the application of data mining. Examples and results from the current EU and other research will be highlighted and explained in detail to the course participants.	5	2	2	K TA [PSA]	1,5	3	3
Risk Engineering & Management / focus / optional compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136489-									
IV-R18:	REM-Special	Several candidates are already available; they will/can be activated according to the needs of the clients. Examples of the candidates are the courses on (3 of the courses assumed for the calculation of the CPs): <ul style="list-style-type: none"> • "Use of KPIs in engineering risk assessment and management" • "Risks related to cultural differences in operation of multinational companies, with a particular emphasis on operation in European projects" • "Data management and IT support systems in industrial risk engineering and management" or • "Legal aspects of risk in industry" 	15	6	6	K TA [PSA]	1,5	3	8
Risk Engineering & Management / focus / optional compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136490-									
V-R90:	REM-PSA	SPO: AI-44a	*	*	29	PSA	1	*	9
Risk Engineering & Management / focus / compulsory / SPO M.Eng. II / Advanced Risk Technologies REM-136491-									
EPF:	Supplementary compulsory (EPF)	SPO: AI-45a	*	*	*	*	*	*	*
Risk Engineering & Management / supplementation / facultative / SPO M.Eng. II / Advanced Risk Technologies REM-136492-									
EF:	Supplementary facultative (EF)	SPO: AI-46a,	*	*	*	*	*	*	*