Hochschule für Technik
Stuttgart

Schellingstrasse 24
70174 Stuttgart - Germany

T +49 (0)711 8926 2679
F +49 (0)711 8926 2922

www.hft-stuttgart.de
ipm@hft-stuttgart.de

Hochschule
für Technik
Stuttgart

Module Description

Master International Project Management

Version: May 2023

1. Technical Basics (TB)

Module leader: Prof. Dr.-Ing. Jakob von Heyl

Learning Units:
IBPM
1.1 Integrated Requirements Management
1.2 Sustainable Urban Building Design
1.3 Construction Technology/ Construction Industry
1.4 Public Building Law
IITM
1.5 Smart Energy Generation
1.6 Smart Mobility Strategies and Management
1.7 Smart Water and Waste Management
1.8 Smart Grid Solutions

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (SoSe)	IBPM/ IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
6	6	90	90	Seminar	Asg, Wex

Learning objectives:

IBPM

- Integrated Requirements Management: Understand the origin and key drivers of user requirements, identify and manage user requirements, and perform stress tests on architectural planning based on changed users and Mega Trends.
- Sustainable Urban Building Design: Reflect and discuss complexities of sustainable urban and building design, appraise project sustainability, transfer knowledge from reference projects to case studies and own projects, present and discuss proposals, and position themselves in the field of sustainability.
- Construction Technology/Construction Industry: Gain an overview of emerging construction technologies and use cases, understand relevant technology constellations and interfaces, and develop own understanding of future construction technology.
- Public Building Law: Compare public building law of different countries, learn basic structures and principles of public building law, identify possible conflicts of interest and deal with problems effectively.

IITM

- Smart Energy Generation: Understand energy production, transportation, storage, and utilization, assess the advantages and disadvantages of renewable and conventional energy sources, and learn about network-based energy systems.
- Smart Mobility Strategies and Management: Learn about various traffic systems, road construction and design, and rail-bound traffic, analyze complex traffic systems and assess future transportation developments, and evaluate economic and legal aspects of transportation.
- Smart Grid Solutions: Understand the basics of Smart Grids, Smart Markets, and Smart Systems in the context of low-carbon electric power supply, assess the necessity of digitalization in the energy sector, and evaluate the energy sector with a focus on industry, regulated and non-regulated entities, and other important stakeholders.
- Smart Water and Waste Management: Learn about the technical components of water supply schemes, wastewater systems, and solid waste management, and understand organisational and contractual models for water supply and wastewater entities.

Learning contents:

IBPM

- Integrated Requirements Management: Origin of user requirements, collecting and managing user requirements, identifying future requirements, and stress testing during planning.
- Sustainable Urban Building Design: Sustainability issues, green building certification systems, climate and location, urban and architectural design, building technology, evaluation of green buildings and sites.
- Construction Technology/Construction Industry: Traditional construction methods, emerging construction technologies, digital collaboration, on-site execution technologies, and supply chain.
- Public Building Law: Significance of public building law for international projects, system and consequences of German public building law, introduction to German urban planning law, public building law of different countries.

IITM

- Smart Energy Generation: Technical and commercial fundamentals of the energy industry, conventional and renewable electricity production, transmission and distribution networks and storages for electricity and gas, pricing, and potential future developments.
- Smart Mobility Strategies and Management: Fundamentals of technology and application of all traffic systems, rail-bound and not rail-bound transportation, local and supra-local traffic systems, function and effectiveness of traffic systems, optimization of traffic systems, and models and technology for the future of traffic.
- Smart Grid Solutions: Transition to a low-carbon electric power supply, overview of electric energy production, Smart Grid, Smart Market, and Smart System, regulatory concepts, technical and financial risks, and case studies of existing IT platforms.
- Smart Water and Waste Management: Water sources and characteristics, water quality standards, water and wastewater treatment technologies, pipeline and network hydraulics, water loss reduction techniques, organisational and business models in the water and wastewater sector, waste management objectives, waste collection and treatment constraints and technologies, and waste management concepts.

Learning methods:

Excursions, Lectures, Group work, Presentations, Discussions

List of reading materials:

See relevant descriptions of particular learning units

2. Management Basics (MB)

Module leader: Prof. Jürgen M. Volm

Learning Units:
2.1 Business Planning
2.2 Management Principles
2.3 Project Management Body of Knowledge
2.4 Agile Project Management

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (SoSe)	IBPM, IITM	N.A.		1 Semester	English
Hours/week	**ECTS**	**Contact hours**	**Non-contact hours**	**Type**	**Assessment**
9	9	135	135	Seminar	Asg, Wex

Learning objectives:

- Business Planning: Identification of key success factors of organisations and application of these. Critical evaluation of business models, projects and organisations. Development of entrepreneurial skills.
- Management Principles: Identification and differentiation of the main management methods. Evaluation of organisational structures and processes. Classification of soft-skill-orientated management issues. Familiarize with (new) management and leadership styles and enhance these skills.
- PMBoK: Develop a fundamental understanding of the project management body of knowledge (PMBoK®) including its project management processes and their interrelations. Preparation for the CAPM®-Exam.
- Agile project management: Familiarize with the classic and agile project approach. Develop the most suitable project approach. Familiarization and application with the elements of the Scrum framework. Understand agile management beyond Scrum

Learning contents:

- Business Planning: Introduction to the business model generation design methods. Introduction to business planning methods. Presentation of best practice examples. Development of own business ideas and investigation of these by applying the tools of business model generation.
- Management Principles: Leadership traits and methods. Awareness and evaluation of different leadership methods. Mission and vision of companies. Company culture. Interdependencies between strategy, tactics, and the organization. Functions of management/leadership. Implications of promoting diversity.
- PMBoK: Introduction to the Project Management fundamentals and core concepts. Introduction to the predictive, plan-based methodologies. Introduction to Business Analysis Frameworks. Introduction to five project management process groups (Initiating, Planning, Executing, Monitoring & Controlling, and Closing).
- Agile project management: Overview of the basics of classic project management (characteristics, roles, and phases). Underlying aspects and principles of agile project management. Details of the Scrum framework (roles, events, artefacts). Creating epics and user stories (including evaluation and estimation). Tools and practices in agile project management.

Learning methods:

Excursions, Lectures, Group work, Presentations, Discussions

List of reading materials:

See relevant descriptions of particular learning units

3. Effective People Management (EP)

Module leader: Prof. Dr.-Ing. Jakob von Heyl

Learning Units:
3.1 Leadership and Communication
3.2 Intercultural Understanding
3.3 Change Management

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (SoSe)	IBPM, IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
7	7	105	105	Seminar	Asg

Learning objectives:
• Leadership and Communication: Develop effective leadership and communication skills, analyze communication styles, manage conflicts, and foster team dynamics. • Intercultural Understanding: Develop intercultural communication skills, understand cultural differences and their impact on work environments, and adapt to different cultural contexts. • Change Management: Understand the process of change, analyse organisational changes and their impact, and develop strategies for effective change management.
Learning contents:
• Leadership and Communication: Leadership styles and theories, effective communication strategies, managing conflicts and difficult conversations, team building and collaboration. • Intercultural Understanding: Cultural differences and their impact on communication and work environments, intercultural communication skills, and adapting to different cultural contexts. • Change Management: Process of change, types of organisational change, resistance to change, strategies for effective change management.
Learning methods:
lectures, group work, case studies, presentations, role-playing exercises & simulations
List of reading materials:
See relevant descriptions of particular learning units

4. Project Management (PM)

Module leader: Prof. Jürgen M. Volm

Learning Units:
4.1 Schedule Management
4.2 Project Organization Methods
4.3 Quality Management
4.4 Lean Management
IBPM
4.5 Construction Cost Management IBPM
IITM
4.6 Construction Cost Management IITM

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (SoSe)	IBPM/ IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
8	8	120	120	Seminar	Asg, Wex

Learning objectives:

- Schedule Management: Guiding procedures, control and execution and implementation of these in projects. Project flow charts for individual project situations. Methods for adjusting project flows to changed constraints and implement them.
- Project Organization Methods: Manage projects in accordance with the body of knowledge in Project Management. Apply different methods and tools with respect to the project phases (objectives, user requirements, decision-making process, change order management procedure, channels of information and communication, coordination of the design/engineering team, supervise the project execution and the hand-over.
- Quality Management: Understand the mystery of Quality. Differentiate between product quality and process quality. Transfer general concepts of Quality Management to the project environment. Apply different tools and techniques to manage Quality. Identify the key challenges for Quality Management in the construction sector.
- Lean Management: Gain an overview of the lean management philosophy, in particular, the Toyota Production System. Familiarize with the common terms and concepts in Lean Management. Transfer the general Lean Management principles to the construction industry. Learn and understand the basic tools and methods in Lean Construction Management.
- Construction Cost Management (IBPM): Apply the basics in cost management from the idea phase to the operations phase. Set up cost structures in an international context. Use benchmarks for verification of construction cost. Apply market price indexation for cost estimates. Conduct cost estimates on different levels of detail. Apply different tools and techniques for cost estimates
- Construction Cost Management (IITM): Learn methods of cost estimation and budgeting. Learn methods of budget control and cost monitoring. Learn about the different characteristics of infrastructure projects. Apply the methods of cost estimation & controlling in a case study.

Learning contents:

- Schedule Management: Process management functions in the model of control loops. Structure of project organisation. Layers of process planning. Illustration of processes in a schedule process. Control and scheduling of appointments. The organisation of information cycles in process management. Training in a

scheduler programme.

- Project Organization Methods: Apply different methods and tools with respect to the project phases. Identify and apply the most appropriate and actual approaches in the project preparation stage, design stage, procurement stage, execution stage, hand-over stage. Application of the methods and tools in a case study example.
- Quality Management: Fundamentals and history of Quality and Quality Management. ‚ncepts and philosophies for Quality Management. Total Quality Management. Promoting Quality through awards. Investigating and controlling Quality. Quality Management for projects. Risk Management.
- Lean Management: Overview of the historical development of Lean Management. Toyota Production System (TPS). Production thinking. Last Planner System (LPS). Takt Planning. Collaboration and value creation with lean approaches.
- Construction Cost Management (IBPM): International approaches for estimating construction cost. Cost structure. Cost benchmarks and indexation. Single Point Estimates. Programming. Elemental cost estimates. Benchmarks and database. Incidental building costs. Cost monitoring. Life Cycle Cost.
- Construction Cost Management (IITM): Characteristics of Infrastructure Projects. Political and legal frameworks. Competition regulations in public infrastructure projects Financing & funding. Public Private Partnership (PPP). Fundamentals and methods of cost estimation. Cost monitoring and Earned Value Analysis. Change Order Management. Claim Management. International comparison of cost planning and monitoring systems.

Learning methods:

Excursions, lectures, presentations

List of reading materials:

See relevant descriptions of particular learning units

5. Managing Real Estate/ Infrastructure (MR)

Module leader: Prof. Dr.-Ing. Jakob von Heyl

Learning Units:
5.1 Project Development
5.2 Digitization in Real Estate and Infrastructure
IBPM
5.3 Real Estate Management
IITM
5.4 Operations and maintenance

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (WiSe)	IBPM/ IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
6	6	90	90	Seminar	Asg, Wex

Learning objectives:

- Project Development: Understand the process of project development, plan and implement project management strategies, and evaluate project success.
- Digitization in Real Estate and Infrastructure: Develop knowledge and skills in digital technologies and their application in real estate and infrastructure, analyze their impact on the industry, and identify opportunities for innovation.
- Real Estate Management: Understand the principles of real estate management, including asset management, property management, and portfolio management, and develop strategies for optimizing real estate assets.
- Operations and Maintenance: Develop knowledge and skills in facilities management, maintenance, and operations, including preventive maintenance, emergency response planning.

Learning contents:

- Project Development: Phases of project development, project management methodologies, project evaluation and performance metrics.
- Digitization in Real Estate and Infrastructure: Digital technologies and their applications in real estate and infrastructure, data management, cybersecurity, and emerging trends in digitization.
- Real Estate Management: Principles of asset management, property management, portfolio management, lease agreements, tenant relations, financial management, and risk management.
- Operations and Maintenance: Facilities management, preventive maintenance, emergency response planning, vendor management, and sustainability in facilities management.

Learning methods:

Lectures, case studies, site visits, group projects, and presentations

List of reading materials:

See relevant descriptions of particular learning units

6. Managing Business & Finance (MF)

Module leader: Prof. Jürgen M. Volm

Learning Units:
6.1 Finance & Accounting
6.2 Investment Appraisal
Electives M6 (2 CPS necessary)
6.3 Contractor's Business Strategies
6.4 Consultant's Business Strategies
6.5 Special Purpose Subject

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (WiSe)	IBPM, IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
7	7	105	105	Seminar	Asg, Wex

Learning objectives:

- Finance & Accounting: Introduction to the basics of corporate accountancy. Distinguish between assets/liabilities/owner's equity, income and expenses. Carry out bookings in double-entry bookkeeping. Create pro forma balance sheets, income statements and cash flow statements.
- Investment Appraisal: Carry out investment appraisals based on shareholder value approaches and thus assess the value-creating contribution of projects. Make financials-based decisions.
- Contractor's Business Strategies: Understand the current situation, trends and challenges of the global construction market. Conduct and interpret a construction market and company analysis Plan. Initiate and steer an organisational transformation process. Implement company strategies and goals.
- Consultant's Business Strategies: Understand the German market of planning, the structures, conditions, and developments. Analyse the situation in a design/engineering or project management office. Organize and manage a design/engineering office in the role of office manager.

Learning contents:

- Finance & Accounting: Financial Statements, Specific Balance Sheet Items, Financial Analysis, Consolidated Financial Statement, Financial Planning, Investment Criteria, Project Analysis and Evaluation, Sources of Finance – Equity and Debt, International Accounting.
- Investment Appraisal: Traditional methods of project assessment (Payback period, Average Return on investment), Discounted Cash Flow techniques for investment appraisal (Net Present Value, Internal Rate of Return), Estimation of risk premiums, Sensitivity analysis as a tool for financial decision-making
- Contractor's Business Strategies: Overview of the international construction industry market. Industrial, technological and social trends. Analysis of international construction companies.
- Consultant's Business Strategies: Scope of Services and interfaces in the design/engineering profession. Key facts and figures about the German market. Basic knowledge of HOAI (fee structure for architects and engineers) and AHO. Plan the design process. Controlling in design/engineering offices.

Learning methods:

Excursions, lectures, presentations, group discussions

List of reading materials:

See relevant descriptions of particular learning units

7. Managing Information (MI)

Module leader: Prof. Dr.-Ing. Jakob von Heyl

Learning Units:
7.1 BIM Management
7.2 BIM Practical Examples
7.3 BIM Applications

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (WiSe)	IBPM, IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
7	7	105	105	Seminar	Asg, Wex

Learning objectives:

- BIM Management: Understand the concept and history of Building Information Modeling (BIM), learn about its impact on processes, technology, and people in the construction industry, and develop skills to better control costs, timing, and efforts on construction projects.
- BIM Practical Examples: Get an overview of international case studies, understand the challenges of implementing BIM on construction projects, learn about international BIM standards and processes, and develop skills to improve quality and reduce costs using BIM coordination and collaboration tools.
- BIM Application: Differentiate between different software solutions for BIM, apply different use cases for BIM, coordinate and collaborate in BIM projects, and use augmented reality (AR) and virtual reality (VR) in BIM projects.

Learning contents:

- BIM Management: Concept and history of BIM, fundamental changes in workflow methodology, impacts of BIM on contracts and project types, BIM technology and interoperability for a coordinated project, design integration, international BIM regulations, conducting change management, implementing BIM at a corporate and project level, the business value of BIM.
- BIM Practical Examples: Traditional ways of creating construction deliverables, BIM technology for better quality deliverables, project management environment in the construction industry, international differences when working on projects, BIM implementation according to ISO 19650, BIM uses and their processes and applications, BIM data exchange formats, training in Solibri Office and Revit, future of BIM and new technologies coming up.
- BIM Application: BIM level in general, specific BIM Level 1, workflow data import, Navisworks basics and advanced, coordination workflow, clash detection, implementation of the collaboration-platform Revizto, issue-management processes and workflow, introduction to Model Server products, common data environment (CDE) in context with BIM software, model view definition (MVD) in context with BIM software.

Learning methods:

Excursions, lectures, group work, presentations

List of reading materials:

See relevant descriptions of particular learning units

8. a. International Workshops (IW)

Module leader: Prof. Jürgen M. Volm

Learning Units:
8.a.1 International Law
8.a.2 Presentation skills
8.a.3 International Project Organization Models

Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (WiSe) Bi-yearly (SoSe, WiSe)	IBPM, IITM	N.A.		1 Semester	English
Hours/week	**ECTS**	**Contact hours**	**Non-contact hours**	**Type**	**Assessment**
6	6	90	90	Seminar, Workshop	Asg

Learning objectives:

- International Law: The diversity of "International" Law. Legal approach to transnational contracts.
- International standard contracts on the example of FIDIC standard terms. Application of the knowledge in a case study approach with an interactive role-play.
- Presentation skills: Analysis and awareness of the needs, knowledge and expectations of the target audience. Communicate with greater clarity and power by using language. Develop effective strategies for planning and preparation. Design dynamic, presentation-enhancing visual aids. Employ effective body language and voice production techniques. Deal confidently with questions, objections and interruptions.
- International Project Organization Models: Differentiate between the various forms of project management in an international context. Apply the appropriate FIDIC contract form to meet specific project requirements. Evaluate the advantages and disadvantages of different organisational models. Become familiar with the international project environment. Manage different stakeholders. Synthesise theoretical concepts with practice. Identify contractual pitfalls in construction contracts.

Learning contents:

- International Law: Public International Law, European Law, International Private Law. Choice of Law. Choice of the forum agreement. Ordinary jurisdiction, arbitral jurisdiction, Alternative Dispute Resolution (ADR, mediation, conciliation and adjudication). Formation of a transnational building contract.
- Presentation skills: Dealing with different native and non-native accents, intonation patterns, subject language and vocabulary. Presentation language and terminology, signposting, structure and technique. Improving slides and visuals. Delivery skills, fluency development, articulation, clarity and pronunciation including pacing, pausing, rhythm and intonation. Non-verbal communication. Managing questions.
- International Project Organization Models: Challenges in international construction projects. Contract methods. FIDIC contracts. Roles and responsibilities in contracts. Design Bid Build and Design Build. Engineer Procure and Construction and Design Build Operate methods. Understanding a client's perspective on international projects. Partnering in international projects / Private Public Partnerships.

Learning methods:

Excursions, lectures, presentations

List of reading materials:

See relevant descriptions of particular learning units

8. b. International Workshops (IW)

Module leader: Prof. Jürgen M. Volm

Learning Units:					
IBPM					
8.b.1 Case Study IBPM					
IITM					
8.b.2 Case Study IITM					
Frequency	Applicability	Prerequisite for participation		Duration	Language
Yearly (WiSe)	IBPM/ IITM	N.A.		1 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
3	4	45	75	Case Study	Asg

Learning objectives:

- Familiarize with fundamental design and management structures in foreign countries and get an overview on emerging markets.
- Quickly tune into complex project situations in a foreign country.
- Integrate acquired soft skills and best project management practices, both related to building and to infrastructure projects.
- Familiarize with comparable design/engineering and construction principles in different countries.
- Quickly analyse complex project situations within their specific conditions.
- Develop and present alternative optimisation suggestions for specific project issues.
- Apply intercultural skills in a foreign country.
- Understand country-specific differences in the way of work and teamwork.

Learning contents:

- Introduction to country fundamentals of construction and management.
- Visit of a complex project as part of a case study.
- Analysis of all aspects of the project as a supervised group work
- Design of alternatives and improvement scenarios for parts of the project that are deemed as possible weaknesses.
- Presentation of work outcomes to those involved in the project (client, architect, engineers, contractors).

Learning methods:

Excursions, lectures, presentations, site visit, group work and presentation

List of reading materials:

See relevant descriptions of particular learning units

9. Master's Thesis in Engineering

Module leader: Prof. Jürgen M. Volm

Learning Units:					
MT.1 Academic Writing					
MT.2 MT Research					
MT.3 MT in Engineering					
Frequency	Applicability	Prerequisite for participation		Duration	Language
Bi-yearly (SoSe, WiSe)	IBPM, IITM	MT in Eng - Minimum 43 ECTS (6 Modules)		3 Semester	English
Hours/week	ECTS	Contact hours	Non-contact hours	Type	Assessment
5	30	75	825	Seminar, Thesis	Asg

Learning objectives:

- Academic Writing: Critically review relevant literature on a specific topic. Analyse and synthesise the literature for academic essay writing. Understand the interrelatedness of analytical issues. Produce an academic essay based on a literature review and analysis.
- MT Research: Compose a research proposal for a Master's Thesis in Engineering. Develop the methodological knowledge and the practical skills required to commence and complete a master thesis. Develop adequate research questions and objectives. Differentiate between different methodological approaches. Develop a research strategy including data collection and analysis. Present and discuss findings. Conclude lucidly. Prepare a research proposal.
- MT in Engineering: Compose a Master Thesis that fulfils the requirements according to the Master Thesis Guide in terms of theoretical and practical implications. Present the research in a well-structured and balanced way. Highlight the importance of the topic. Present a literature review with relevant references. Explain the method and methodological choices. Present the findings and discuss them. Conclude and provide insights into limitations and further research. Use Harvard Referencing. Present the Master Thesis in a short presentation.

Learning contents:

- Academic Writing: Parts and structure of academic essays. Reading and note-taking. Referencing and plagiarism. The use of IT for academic writing. Ethical questions in research. Writing techniques and habits.
- MT Research: Aspects of research methods. Finding relevant reading materials and their utilisation. Develop a research question and objectives. Philosophical considerations. Data collection and analysis (qualitative and quantitative methods). Presenting findings. Scientific writing style.
- Master Thesis in Engineering: Individual supervision in relation to the chosen topic.

Learning methods:

Lectures, essays, workshops with practical exercises, individual feedback sessions

List of reading materials:

See relevant descriptions of particular learning units