

Module number 24 – 26 (BW) 27 – 29 (BM) 33 (EB)	Module title Financial Modeling and Prediction (FMP)		
Code FMP	Semester Depends on course programme	Number of WSH 4	Module offered Changing Catalogue. Details can be found online.
Module coordinator Prof. Dr. Wolfgang Hößl	Tuition type Seminar-style tuition with hands-on lab work (practical case studies)		Module duration 1 Semester
Lecturer Prof. Dr. Wolfgang Hößl	Compulsory/Elective Elective		Module language German or English
Learning outcomes The qualification goals mentioned below are subdivided into three dimensions. Each dimension corresponds to a target competence level. The following competence levels have been defined: Competence level 1 (awareness): cursory awareness of simple structures, only previously learned knowledge is tested Competence level 2 (comprehension): basic understanding of multiple structures up to deeper understanding of the relations between structures, learned knowledge is analyzed, combined and applied Competence level 3 (deep understanding and application): deeper understanding of the relations between structures up to independent transfer and extension of knowledge to new structures, learned knowledge is critically questioned and/or evaluated, interrelations between structures and their consequences are reflected and explained The competence level of the respective qualification goal is represented by the corresponding number (1, 2 or 3) in the competence descriptions below. On completing the module the students will have achieved the following learning outcomes on the basis of scientific methods: <u>Subject skills</u> Students are able to build financial models (investment appraisal, cost of capital, company valuation, hedging, scoring) in a structured, documented and verifiable way using Excel and KNIME (3). They can obtain, clean, aggregate and analyze real market and company data (3). They can forecast business time series (naive methods, exponential smoothing, regression, tree-based machine-learning models), measure forecast quality and critically assess the limits of prediction, in particular in efficient markets (3). They can compute return, risk and performance measures and critically evaluate their informative value (3), derive the cost of capital from market data using the CAPM (3), and value companies with DCF and multiples methods, communicating value ranges instead of point estimates (3). They can model hedging strategies with derivatives and compare scenarios (2), apply classification and anomaly-detection methods as well as generative-AI components and judge their limitations (2–3), and recognize model risks (estimation error, overfitting, spreadsheet errors) and apply appropriate countermeasures (2). <u>Method skills</u>			

Students independently develop solution paths for open problem statements and systematically evaluate and document failed attempts (3). They select the appropriate tool for a given problem (spreadsheet, workflow, platform) (3) and apply a consistent workflow of benchmarking, evaluation and communication of uncertainty (3). They use AI tools as a drafting aid under a verification discipline – draft, verify, reproduce, document (2).

Personal and social skills

Students present analysis results in an addressee-oriented way and defend them (2), and work in teams to implement end-to-end case studies (2). They independently familiarize themselves with new tools using documentation and communities (3) and critically reflect on the ethical, regulatory and governance implications of data-driven financial decisions (2).

Content

- Financial data literacy and spreadsheet engineering; investment appraisal (NPV, IRR, scenarios, break-even)
- Data workflows with KNIME: import, consolidation, KPIs and dashboards
- Time-series forecasting, Return, risk, drawdown, Sharpe ratio and diversification
- Market efficiency, backtesting of trading strategies and paper trading
- Beta estimation, the CAPM and the cost of capital (WACC)
- Company valuation: discounted cash flow (DCF), multiples, scenario and Monte-Carlo analysis
- Currency risk and hedging with forwards and options
- Credit scoring and fraud detection with machine learning; cost-sensitive decisions
- Generative AI in finance and AI governance
- Tools used: Microsoft Excel and KNIME Analytics Platform (optionally Interactive Brokers paper trading and cloud/AI services)

Literature

Required reading

Brealey, R. / Myers, S. / Allen, F.: Principles of Corporate Finance, Maidenhead

Drukarczyk, J. / Schüler, A.: Unternehmensbewertung, München

Hyndman, R. J. / Athanasopoulos, G.: Forecasting: Principles and Practice, online (otexts.com/fpp3)

Recommended reading

Ernst, D. / Schneider, S. / Thielen, B.: Unternehmensbewertungen erstellen und verstehen, München

Steiner, M. / Bruns, C. / Stöckl, S.: Wertpapiermanagement, Stuttgart

Bösch, M.: Derivate, München

James, G. / Witten, D. / Hastie, T. / Tibshirani, R.: An Introduction to Statistical Learning, New York

Schüler, A.: Finanzmanagement mit Excel, München

latest edition each

Teaching and learning methods

The course takes place in person as a hands-on lab. Each session is built around a single practical case study – a continuous fictional case company – into which short conceptual inputs, guided tool walkthroughs and, above all, independent student work are embedded (approx. 60% self-directed work). Students build the models and workflows themselves in Excel and KNIME; optional elements include paper trading and cloud/AI services.

Learning materials are provided as slide decks and case handouts together with datasets and starter/solution files. The use of AI tools is permitted and must be documented (tools and prompts).		
Type of examination/Requirements for the award of credit points	Portfolio Consisting of three individual assignments (models and analyses) and a team case study with presentation and live demonstration.	
Other information	Max. number of participants: 25 Registration necessary. Details can be found in ELO. Lecture Times: Will be released in the schedule.	
ECTS-Credits 5	Workload 150 hours Contact/attendance time: 60 h Additional work: 90 h	Weighting of the grade in the overall grade 5