Course:	International Business with Case Studies in Industry
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	This course has two parts. First the course examines the practice of management within Europe. The course takes a multi- organizational perspective and places the practice of management in a global perspective. The second part of the course uses a series of videotapes to augment the study of multinational enterprises (MNEs)
Language of instruction	English
Frequency	Winter semester only
Course Coordinator/Instructor	Prof. Baldur H. Veit, LL.D.; Assessor phil., Director of International Studies, Prof. of Management (Kettering University, Flint, MI, USA)
Restrictions (if applicable)	Admission capacity for this course is limited None
Prerequisites:	Senior Standing
Course learning objectives:	To provide the students with a contrast to American style of management. To provide the students with an expanded view of management
Contents:	German Unification: Demographics, Economic System, Import / Export; How to incorporate in Europe, Social Security System in Germany, Germany and the European Union, The Dual System of Vocational Training in Germany, German Industry on the Road of Globalization, German-American Trade Relations, Automotive Industry in Germany
Textbooks:	Essential: All handouts will be provided by the professor
Assessment	Graded: oral exam, presentation etc.

Course:	**Germany within Europe - Past and Present**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture, Regular attendance and regular reading of current newspaper and magazine texts is required.
Language of instruction	English
Frequency	Summer semester and Winter semester
Course Coordinator/Instructor	Udo Stelzer, M.A. (University of Tübingen, American Studies, Geography and Political Science); visiting assistant professor at Tufts University; former Resident Coordinator of California State University International Program; Academic Advisor, Washington University
Restrictions (if applicable)	Admission capacity for this course is limited None
Prerequisites:	
Course learning objectives:	To create a thorough understanding of themes and trends in Germany today, based on the historical and cultural legacy of a nation on the crossroad of European history.
Contents:	Europe in the Middle-Ages; Becoming a Nation; German American Migration; From the Ist Reich to the III rd Reich; Myth of the "Zero" Hour; The economic miracle; Revolutions - from 1968 to 1989; The "new" Germany;
Recommended reading	AXELROD, Alan; PHILLIPS, Charles: What everyone should know about the 20th century, Adam Publishing, Holbrook MA, 1995 DOREN, Charles van: A History of Knowledge, The pivotal events, People and Achievements in World History, Ballentine Books, New York, 1992 TARNAS, Richard: The Passion of the Western Mind, Understanding ideas that shaped the Western World View, Random House, Toronto, 1993
Assessment	Students will be tested on the course material by means of two written tests (midterm and final). Midterm 30%; Final 50%; Attendance, Participation 20%

Course:	**Lean Management**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture (40%), Workshops (10%)
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	n. n.
Restrictions (if applicable)	Admission capacity for this course is limited None
Prerequisites:	
Course learning objectives:	At the end of the course students should be able - to understand the concepts of Lean Management, Total Quality Management and Business Process Reengineering -to apply tools and techniques to analyze and optimize business and production processes - to provide knowledge about Change Management process.
Contents:	This course is designed to provide American students with a framework to understand Lean Management, Total Quality Management and Business Process Reengineering - Lean Management - Total Quality Management - Reengineering - Change Management
Textbooks	Handouts provided by professor. Literature used will be introduced during the first meeting
Assessment	A two hour written exam at the end of the semester

Course:	**Semiconductor Physics and Technology**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Lectures and videos
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	A. Görlach, Dipl.-Phys., Robert Bosch GmbH, Automotive Electronics, Reutlingen
Restrictions (if applicable)	Admission capacity for this course is limited None
Prerequisites:	
Course learning objectives:	Introduction to the physical principles of modern semiconductor devices and their advanced fabrication technology. Influence of technological parameters on the electrical behavior of devices.
Contents:	Semiconductor Physics and Devices: Fundamentals of Semiconductor Physics Diodes / Rectifier Metal-Oxide-Semiconductor Field-Effect Devices Technology: Crystal Growth and Epitaxy, Film Formation Lithography and Etching, Impurity Doping, Integrated Devices, Simulation of Semiconductor Devices, Packaging and Thermal Management, Reliability of Semiconductor Devices
Recommended reading list	Semiconductor Devices: Physics and Technology, John Wiley & Sons, 2nd edition, 2001 B. J. Baliga, Power Semiconductor Devices, PWS Publishing Company, 1996 P. v. Zant, Microchip Fabrication, McGraw-Hill, 2000
Assessment	A two hour written exam at the end of the semester

Course:	**Advanced Communication Technology**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	lecture (50%) and presentations of projects (50%)
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	Prof. Dr.-Ing. Albrecht Oehler
Restrictions (if applicable)	
Prerequisites:	Bachelor: Basics of Electrical Engineering, Communication Systems, Information Technique Laboratory
Course learning objectives:	This course aims to provide the students with knowledge of information transmission within mobile networks and applications of mobile networks
Contents:	Lecture on theory: Communication networks (recap on digital signals, switching, reference model, mobile communication networks), Wave propagation (line theory), Free space transmission Projects (homework with presentation) on applications: Identification systems (Barcode, RFID), Antennas and satellite systems, Global System for Mobile Communication (GSM, UMTS), Global Positioning System (GPS), Wireless local area networks (W-LAN)
Textbooks	Guru, Bhag S., Hiziroglu, Huseyin R.: Electromagnetic field theory fundamentals. PWS Publishing Company, Boston, 1998
Assessment	Presentation of project and written final (2 hours)

Course:	**Industrial Ecology**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture (40%), Workshops (10%)
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	Prof. Peter Kleine-Moellhoff
Restrictions (if applicable)	
Prerequisites:	Basic technical and management understanding
Course learning objectives:	This lecture provides a general understanding for different aspects of sustainable management and appropriate technologies. After this lecture, the students must be able to use and apply methods for the systematic optimisation of products and processes to reduce resource needs, environmental impacts and costs.
Contents:	Introduction into the topic Sustainability: Environment, Economy and social responsibility Technology and Environment Legal framework, Sustainability company rating Sustainability strategies Life-Cycle Assessment, ECO-design Professional material flow and energy management Case studies on industry examples
Textbooks	**Essential:** T. Graedel et. al., Industrial Ecology, Pearson Education, New Jersey, 2003 **Supplementary:** C. Fussler et. al., Driving Eco Innovation, Pitman Publishing, London, 1996
Assessment	Written examination (1.5 hrs)

Course:	**Energy Systems Lab**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture (40%), Workshops (10%)
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	Prof. Dr.-Ing. B. Thomas, Prof. Dr.-Ing. M. Parvizinia
Restrictions (if applicable)	
Prerequisites:	Thermodynamics Fluid Mechanics Power Engines
Course learning objectives:	Apply basic knowledge to practical installations. Experience the machinery for energy conversion such as heat exchanger, Heat pump, AC-unit, fuel cell, pumps and turbines by operating them in the lab. Learn to take measurements and to analyze them in order to elaborate basic physical principles. Prepare proper reports for the laboratory experiments
Contents:	The Energy Systems lab provides hands on experience in the various fields of Thermodynamics and Fluid Mechanics focusing on machinery for energy conversion such as heat exchanger, Heat pump, AC-unit, fuel cell, pumps and turbines.
Textbooks	Detailed script for each laboratory experiment including instructions as well as theory including further references
Assessment	Laboratory assignments

Course:	**Heat Transfer**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture, Workshops
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	Prof. Dr.-Ing. Bernd Thomas
Restrictions (if applicable)	
Prerequisites:	
Course learning objectives:	Learners know the fundamentals of heat transfer. Learners are able to apply gained knowledge to analyze, design and select heat transfer objects, like heat exchangers, radiators and building heating components, including temperature measurement components, their usage and limitations.
Contents:	Fundamentals, Thermal Conduction, 1-dimensional conduction, Integral approach, 1-dimensional conduction, Convection, Thermal boundary layer and heat transfer coefficient, Heat transfer correlations, Thermal radiation, Overall heat transfer, heat exchangers, The overall heat transfer coefficient, Heat exchangers, Fined surfaces, Thermal conduction, differential approach, 1-dimensional conduction incl. internal heat generation, 2 and 3-dimensional conduction, The transient differential equation
Textbooks	F.P. Incropera, D.P. DeWitt, T.L. Bergmann, A.S. Lavine Introduction to Heat Transfer John Wiley & Sons, 6th ed., 2011 T.L. Bergmann Fundamentals of Heat and Mass Transfer John Wiley & Sons Inc, 8th ed., 2016
Assessment	Graded: Written exam, 2 hours

Course:	**Analysis, Chemical, Laboratory**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture (40%), Workshops (10%)
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	
Restrictions (if applicable)	
Prerequisites:	
Course learning objectives:	
Contents:	
Textbooks	Detailed script for each laboratory experiment including instructions as well as theory including further references
Assessment	Laboratory assignments

Course:	**Mechatronics, Interface, Laboratory**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	Seminar style lecture (40%), Workshops (10%)
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	
Restrictions (if applicable)	
Prerequisites:	
Course learning objectives:	
Contents:	
Textbooks	Detailed script for each laboratory experiment including instructions as well as theory including further references
Assessment	Laboratory assignments

Course:	**Cloud Computing / Internet Workings**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	Please see the two additional course descriptions further down
Hours per week / total contact hours	
Total hours of study	
Type/Teaching Method	
Language of instruction	
Frequency	
Course Coordinator/Instructor	
Restrictions (if applicable)	
Prerequisites:	
Course learning objectives:	
Contents:	
Textbooks	
Assessment	

Module:	Internetworking	
Code:	mkiB35	
Subtitle:	Networks and Protocols	
Course elements:	Lectures	
Semester:	Every semester	
Module coordinator:	Prof. Dr. Marcus Schöller	
Lecturer:	Prof. Dr. Marcus Schöller	
Language:	German, English	
Allocation to the curriculum:	**C**ompulsory subject, 3rd semester	
Mode of teaching/semester hours per week (SWS):	Lecture	4 SWS
Total hours:	Contact time Independent study	60 hours 90 hours
Credits:	5 ECTS	
Prerequisites in accordance with examination regulations (StuPro):	None	
Recommended prerequisites:	None	
Mode of assessment:	Lectures: Written examination Practical sessions	

Module objectives:

This module equips students with knowledge about the Internet's infrastructure and communication protocols. Students have already gained an initial insight into programming web applications in the Informatics 2 module. This is used as a basis for discussing the main Internet protocols on all layers and classifying them within the ISO/OSI reference model. At the same time, students are introduced to the hardware that is used in this context, all the way through to Ethernet wiring.
This module lays the foundations for subsequent modules, including Distributed Systems and IT Security in the 4th semester of the degree programme, as well as Mobile Computing and Cloud Computing in the 6th semester.
Knowledge:

- Be able to name the layers and tasks of the ISO/OSI reference model, as well as the TCP/IP model.

- Be able to name typical Internet protocols (such as HTTP, FTP, SMTP, SNTP, DNS, TCP, UDP, IP, ICMP, DHCP, ARP, CSMA/CD, CSMA/CA, TDMA, Ethernet and WLAN), be able to describe their functions and protocol headers, and be able to categorise protocols into the reference model layers.
- Be able to explain the stop-and-wait algorithm and the sliding window algorithm.
- Be able to describe overload control methods in TCP.
- Be familiar with various types of framing (byte count method, sentinel method).
- Be able to name and describe basic terminology and processes associated with error detection (Hamming distance, parities, CRC).
- Be able to reproduce modulation types and typical coding methods (such as NRZ, NRZI and Manchester).
- Be familiar with performance parameters for networks.
- Be able to name typical transfer modes, network topologies and their properties. Be able to specify the hardware involved in an Internet infrastructure (such as routers, switches and hubs) and describe how it works.
- Be able to explain the hidden node problem and potential solutions (MACA and MACAW).

Skills:

- Be able to structure communication in multi-tier architectures, from the database server, to the application and web server, all the way through to the client.
- Be able to structure home and intranet computer connections to the Internet.
- Be able to program socket connections and simple client-server applications in Java.
- Be able to calculate examples of distance vector routing, link state routing and the spanning tree algorithm on the basis of a graph.
- Be able to outline routing between various subnets and calculate Ethernet subnetwork masks.
- Be able to log and evaluate Internet communication using a sniffer.

Content:

This module picks up at the point where students left off in Informatics 2 and Informatics 3, in which they gained their first experience of programming web applications. Starting from the application layer and working all the way through to management level, it presents and analyses typical Internet protocols, algorithms, processes and hardware.
003] (LO5).

Literature:

- Calvert, Kenneth L.; Donahoo, Michael J. (2008): TCPIP sockets in Java. Practical guide for programmers. 2nd ed. Amsterdam, Heidelberg: Morgan Kaufmann (The Morgan Kaufmann Practical Guides Series).
- Kurose, James F.; Ross, Keith W. (2012): Computernetzwerke. Der Top-Down-Ansatz. 5th edition, updated. Munich: Pearson (Always Learning).
- Peterson, Larry L.; Davie, Bruce S. (2000): Computernetze. Ein modernes Lehrbuch. 1st edition. Heidelberg: Dpunkt-Verl.
- Tanenbaum, Andrew S. (2003): Computernetzwerke. 4th edition, revised. Munich: Pearson (Pearson Studium).
- Stein, Erich (2004): Taschenbuch Rechnernetze und Internet. Mit … 105 Tabellen. 2nd edition, revised. Munich: Fachbuchverlag Leipzig.
- WireShark Network Sniffer: <http://www.wireshark.org/>

Module: Cloud Computing

Code:	mkiB65	
Subtitle:		
Course elements:	Lectures	
Semester:	Every semester	
Module coordinator:	Prof. Dr. Marcus Schöller	
Lecturer:	Prof. Dr. Marcus Schöller	
Language:	German, English	
Allocation to the curriculum:	Compulsory subject,6th semester	
Mode of teaching/semester hours per week (SWS):	Lectures	4 SWS
Total hours:	Contact time Independent study	60 hours 90 hours
Credits:	5 ECTS	
Prerequisites in accordance with examination regulations (StuPro):	None	
Recommended prerequisites:	None	
Mode of assessment:	Lectures: Written examination Practical sessions	

Module objectives:

Nowadays, mobile computing and cloud computing depend on one another. Participants in this module are required to gain comprehensive knowledge of designing, developing and operating distributed applications, with a focus on the basic forms that cloud services and their delivery models take. This requires them to possess the knowledge taught by the prerequisites listed above. The Distributed Systems module provides the general foundations for web programming and web services.

Learning outcomes:

Knowledge:
Students who have successfully completed this module will possess knowledge of the principles and characteristics of cloud computing. They will be able to describe typical services and delivery models, and evaluate them on the basis of case studies. They will havedeveloped an understanding of the technical, organisational, commercial, legal, social and security-related aspects of cloud computing.

Skills:

Students are able to analyse the requirements of server services as well as develop and evaluate appropriate deployment variants. These variants range from in-house server solutions to hybrid cloud models and all the way through to straightforward cloud solutions. To do so, they apply a range of methods they have learned. Based on these requirements, students are able to develop services that use the characteristics of the cloud. Additionally, students are able to install and operate servers and cloud systems, which enables themto perform a more in-depth comparison of the various deployment variants. As a result, students are able to perform full-scale analyses and evaluations, and thus make technical decisions for service provision purposes.

Content:

Building on the Distributed Systems module, this module takes an in-depth look at some of the paths of development that led to cloud computing, specifically the use of TP monitors and application servers, the use of virtualisation technology, and grid computing.
The module presents the service models Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS) from a provider's perspective anda user's perspective. The focus is on software development for the cloud and how a cloud system is operated. Students are taught about the public cloud, private cloud, hybrid cloud and community cloud delivery models on the basis of case studies. This focuses on how the models relate to mobile applications. The module considers, evaluates and discusses the technical, organisational, commercial, legal, social and security-related aspects of cloud computing in detail.

Forms of media:

Lectures in seminar format; slides and writing on the board; case study work in small groups.

Literature:

- Antonopoulos, Nick; Gillam, Lee (2010): Cloud Computing. Principles, Systems and Applications. London: Springer London (SpringerLink: Bücher, 0).
- Baun, Christian; Kunze, Marcel; Nimis, Jens; Tai, Stefan (2011): Cloud Computing. Web-basierte dynamische IT-Services. Berlin, Heidelberg: Springer Berlin Heidelberg (SpringerLink: Bücher).
- Buyya, Rajkumar (2011): Cloud computing. Principles and paradigms. Hoboken,NJ: Wiley (Wiley Series on Parallel and Distributed Computing).
- Velte, Anthony T.; Velte, Toby J.; Elsenpeter, Robert C. (2010): Cloud computing. A practical approach. New York, NJ: McGraw-Hill.

Course:	**Applied Business Ethics**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	• Improvement of communication skills by: Theory: introduction of basic knowledge of communication theories Practice: case studies in team work and class discussions • Improvement of digital skills by: Theory: introduction to digital ethics Practice: case studies in team work and class discussions
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	n. n.
Restrictions (if applicable)	Admission capacity for this course is limited None
Prerequisites:	
Course learning objectives:	• Knowledge, skills and capabilities for ethical decision making in a global business environment. Students will learn about the four steps for ethical decision making. Methodological competencies: • Knowledge and capability to transfer theoretical knowledge on given real problems in daily business life by going through 5 steps Ethics management applicable in all situations.
Contents:	• Definitions of terms in business ethics • Significance of ethics in modern global economy • Theory of social systems • Philosophical roots of business ethics (from Plato to Kant and to nonwestern ethics approaches) • Modern business ethics approaches (ethics of discourse, principle based ethics, ethics of governance, etc.) • Business ethics in the management triangle • Integrity, governance and compliance management • Guidelines, standards, ratings, and certifications in business ethics and CSR
Textbooks	Handouts provided by professor. Literature used will be introduced during the first meeting
Assessment	A two hour written exam at the end of the semester

Course:	**European Business Law**
Study Program **Study level and semester**	International Exchange Student non-degree seeking (Offerings within the International Study Program 2023)
ECTS Credits	4
Hours per week / total contact hours	4 per week
Total hours of study	
Type/Teaching Method	An integrated system of courses and practical sessions in the form of case discussions focusing on decisions of the European Commission and European Court of Justice. Cases of particular importance will be distributed and students will be requested to prepare some of them independently at home.
Language of instruction	English
Frequency	Winter semester
Course Coordinator/Instructor	Prof. Dr. Bernd E. Banke
Restrictions (if applicable)	Admission capacity for this course is limited None
Prerequisites:	
Course learning objectives:	This course is designed to provide international students with a framework to understand the European Union. The legal system in the new European Union serves as a vehicle to explain this economic system.
Contents:	Introduction The Institutions of the European Union The Community Law Fundamental Rights Competition Law/Industrial Policy Company Law in the European Union
Textbooks	Handouts provided by professor. Literature used will be introduced during the first meeting
Assessment	A two hour written exam at the end of the semester