Modulhandbuch

Studiengang Process Engineering (Master)

Hochschule für Technik, Wirtschaft und Medien Offenburg

Fakultät

Maschinenbau und Verfahrenstechnik

Badstraße 24
D-77652 Offenburg
Tel.: (0781) 205 - 0
www.fh-offenburg.de

Erstellt am 03.04.2008

Modulbeauftragter: Prof. Dr. rer. nat. Detlev Doherr

10 Credit(s) | 12 SWS
Semester: MPE 1

Lehrveranstaltung(en):
Environmental Informatics
Soil Decontamination/Disposal Site Engineering
Sustainable Energy Systems

Lernziele und Kompetenzen

The students use computer applications as geographic information systems (GIS) for capturing, storing and analyzing spatial data.
They create maps for resource management as well as environmental impact assessment.
They simulate environment processes and calculate risks for waste deposits.

Arbeitsaufwand

-Environmental Informatics

Presence during lessons: 4 * 15 = 60 h

Preparation and repetition: 2 * 15 * 2 = 60 h

Total: 120 h

-Contaminated Land treatment/ Waste deposits

Presence during lessons: 15 * 2 = 30 h

Preparation and repetition: 15 * 2 * 1,5 = 45 h.

Total: 85 h

-Sustainable Energy

Presence during lessons: 4 * 15 * = 60 h

Preparation and repetition: 2 * 15 * 2 = 60 h

Total: 120 h

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The final note of the module is defined by:

Modulbeauftragter: Prof. Dr. rer. nat. Detlev Doherr

10 Credit(s) | 12 SWS

Semester: MPE 1

Environmental Informatics 40 %
Sustainable Energy 40 %
Contaminated Land treatment/Waste deposits 20 %

To finish the whole module successfully, all parts of the module have to be finished at minimum with the note 4.0.

Vorlesung | 4 SWS
Semester: MPE 1
Klausur K60

DozentInnen:
Prof. Dr. rer. nat. Detlev Doherr

Modul:
Geotechnics

Sprache

Anglais

Voraussetzungen

Principles of Geology
Principles of Informatics
Some experiences in use of Computer Aided Design

Inhalte

- Graphic data processing with Computer Aided Design and Geographic Information Systems (GIS)
- Methods of cartography and digitalization of spatial data
Kartographie und Digitalisierung
- Satellite scenes
- Environment models and scenarios
- Simulation

Lehrform

The participients work with modern computer applications to digitize and analyse data, which they measured in the field, got from satellite scenes or cartographic maps
They create environment models and simulate geo processes.
They define scenarios in the area of waste depositing, groundwater modelling, and exploration for geothermal heat.

Literatur

- Digitalisieren, SUESS, P., http://131.220.125.175, 1997
- Geoinformationssysteme in den Geowissenschaften- Theorie, Funktionalitäten, Daten. In: Taschenbuch Flächenrecycling GeoProfi, Doherr, D., W. Beimann:, Glückauf, 2000
- GIS in Forschung und Praxis, BUZIEK , Wittwer, 2000
- GIS-Tutorial, STAHL, R., http://131.220.125.175/ einleitg/einleit.htm, 1997

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Vorlesung | 4 SWS
Semester: MPE 1
Klausur K60

DozentInnen:
Prof. Dr. rer. nat. Detlev Doherr, Prof. Dr. rer. nat. Günter Kunz

Modul:
Geotechnics

Sprache

Anglais

Voraussetzungen

Principles of Geology

Inhalte

- Principles of soils and rocks
- Methods of soil decontamination
- Waste deposits and risks
- Concepts of nuclear waste deposits in Germany

Lehrform

The participants work with modern laboratory equipment to analyse soil and water pollution, learn the influences of geo processes, and work out plans for treatment of contaminated soils. Additionally they check technical and natural barriers from waste deposits and evaluate risk factors.

Literatur

- Altlasten, Weber, H., Springer, 1995
- Ausgewählte Anforderungen an die Ablagerung von Abfällen in der TA Siedlungsabfall.- UTA, Heft 4/93, S. 279-292, Stief, K., 1993
- Lehrbuch der Bodenkunde, Schachtschnabel, P., Enke, 1992
- Weitere Literaturangaben erfolgen in der Lehrveranstaltung, 2000

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DozentInnen:
Prof. Dr. rer. nat. Detlev Doherr

Modul:
Geotechnics

Sprache

Anglais

Voraussetzungen

Principles of Geology, principles of Environmental Informatics

Inhalte

- Global energy supply
- Fossil reserves and resources
- Geo potentials for renewable energy
- Geothermal heat projects in the area of the German Oberrhein

Lehrform

The participants of the course learn the principles of fossil and renewable energy resources, calculate reserves and resources of coal and petroleum by Computer applications and define scenarios for substitute the energy supply by checking the renewable geo potentials

Literatur

- Basiswissen Physikalische Chemie, C. Czeslik, H. Seemann, R: winter, Teubner, Stuttgart, 2001
- Mineralische Rohstoffe- Bausteine für die Wirtschaft.- Bundesanstalt Geowissenschaften und Rohstoffe, 2000
- VDI 4640 - Richtlinie Thermische Nutzung des Untergrunds, erdgekoppelte Wärmepumpen, VDI-Gesellschaft Energietechnik, 2000

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Simulation and Visualisation of Biotechnical Processes

Modulbeauftragter: Prof. Torsten Schneider, PhD.

10 Credit(s) | 8 SWS
Semester: MPE 1

Lehrveranstaltung(en):
Dimensioning Fermenters
Flow Simulation
Technical School Fermentation
Technical School Fluid Mechanics

Lernziele und Kompetenzen

In small groups the students work on different aspects of a project and bring the results together. In this way they do not only deepen their knowledge in biotechnology, but learn to solve problems in groups which must communicate with each other.

Arbeitsaufwand

Total complete module 300 hours, including in course:

1) Dimensioning Fermenters:
presence during lectures: 15 * 2 = 30 h,
preparation and post-processing: 15 * 3 = 45 h,
workshops: 7 * 4 = 28 h,
exam preparation 2 days: 2 * 8 = 16 h.
total 119 hours

2) Flow Simulation:
presence during lectures and in lab: 15 * 2 = 30 h,
exercises 15 * 2 = 30 h,
preparation and post-processing: 15 * 2 = 30 h.
total 90 hours

3) Technical School Fermentation:
presence in lab including safety instructions: 6 * 6 + 1= 37 h,
organisation and post-processing: 9 * 6 = 54 h.
total 91 hours

4) alternatively Technical School Fluid Mechanics:
presence in lab including safety instructions: 6 * 6 + 1 = 37 h,
organisation and post-processing: 9 * 6 = 54 h,
total 91 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Wahl

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is composed of the marks of the exams in "Dimensioning Fermenters" and "Flow Simulation" at a ratio of 7:3. Precondition for being admitted to the exam in "Dimensioning Fermenters" is the successful participation in one of the two technical schools, courses 3) or 4) of the module. This is documented by the lab report being testified "sucessful".

Simulation and Visualisation of Biotechnical Processes

Modulbeauftragter: Prof. Torsten Schneider, PhD.

10 Credit(s) | 8 SWS

Semester: MPE 1

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Vorlesung | 2 SWS
Semester: MPE 1
Klausur K60

DozentInnen:
Prof. Torsten Schneider, PhD., Prof. Dr. rer. nat. Christiane Zell

Modul:
Simulation and Visualisation of Biotechnical Processes

Sprache

Anglais

Voraussetzungen

Basics of biotechnology, process simulation and fluid mechanics from the bachelor course "Verfahrenstechnik" or equivalent courses.

Inhalte

(A) Biological Aspects (Zell)

(B) Scale-up and Dimensioning of Fermenters (Schneider)

(C) Division of Labour while Working on a Project (groups)

Lehrform

The individual courses are interlinked. As a result the module is a multidisciplinary project to be organized by the students and the lecturers within a limited period of time.

Apart from attending the lectures the students work in parallel in groups, and bring together their results during workshops. In this way they also deepen their knowledge in biotechnology.

Literatur

- Biological Reaction Engineering, Dunn, I.J.; Heinzle, E.; Ingham, J.; Prenosil, J.E., Wiley-VCH, 2003
- Bioprozesstechnik, Chmiel, H., Elsevier Spektrum Akademischer Verlag, 2006
- Bioseparation and Bioprocessing, 2nd edition, Subramanian, G., Wiley VCH, 2007
- Handbuch der Rührtechnik, EKATO Rühr- und Mischtechnik GmbH , 2000
- Ullmann`s Biotechnology and Biochemical Engineering, Wiley VCH, Wiley VCH, 2007

DozentInnen:
Prof. Dr.-Ing.habil. Karl Bühler

Modul:
Simulation and Visualisation of Biotechnical Processes

Sprache

Anglais

Voraussetzungen

Basics of biotechnology, process simulation and fluid mechanics.

Inhalte

A) Principles
1. Continuity laws for mass, impulse and energy,
2. Navier-Stokes equations and continutiy of energy in thermodynamics and fluid mechanics,
3. Simplifications e.g. by means of Boussinesq approximation.

B) Similarity in Mechanics
1. Dimensional analysis and dimensionless numbers,
2. Laws of similarity and scale-up rules.

C) Numerical methods of simulation
1. Finite differences methods,
2. Finite volume methods,
3. Integration of the area of solution.

D) Application of commercial codes
1. Survey of programmes: Femlab, Ansys-CFX, Fluent, Star-CD
2. Pre- and postprocessing
3. Simulation of selected examples

Lehrform

In the lecture the principles of flow simulation are taught. Numerical methods are discussed and applied by means of simple case studies. Particular process engineering problems are numerically solved in small groups and subsequently analyzed in an accompanying laboratory. The students present their results in work-shops.

Literatur

- Ähnlichkeitsgesetze und Modellregeln, J.Zierep, Braun-Verlag-Berlin, 1991
- Strömungsmechanik, J.Zierep, K.Bühler, Springer Verlag, 1991

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Labor | 2 SWS
Semester: MPE 1
Laborarbeit

DozentInnen:
Prof. Dr. rer. nat. Christiane Zell

Modul:
Simulation and Visualisation of Biotechnical Processes

Sprache

Anglais

Voraussetzungen

Basics of biotechnology, process simulation and fluid mechanics from the bachelor course "Verfahrenstechnik" or equivalent courses.

Inhalte

The students produce independently under guidance a product to be selected (for example Xanthan-gum or baking yeast) in a fermenter.

This includes timing, preparation, and performing the fermentation, as well as processing and examination of the product.

Lehrform

In small groups the students work in parallel on various aspects of a fermentation project. In common workshops they bring these aspects together, and consolidate their knowledge in bio-engineering.

Each group selects a chairman. The chairmen of the groups coordinate the project under guidance.

Literatur

- Biological Reaction Engineering, Dunn, I.J.; Heinzle, E.; Ingham, J.; Prenosil, J.E., Wiley-VCH, 2003
- Technical School Fermentation (Lab notes), Zell, C.; Schneider, T., 2008

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Labor | 2 SWS
Semester: MPE 1
Laborarbeit

DozentInnen:
Prof. Torsten Schneider, PhD.

Modul:
Simulation and Visualisation of Biotechnical Processes

Sprache

Anglais

Voraussetzungen

Basics of biotechnology, process simulation and fluid mechanics from the bachelor course "Verfahrenstechnik" (process engineering) or equivalent courses.

Inhalte

In open mixing vessels the conditions in stirred fermenters are simulated by means of model liquids.

Depending on the substance produced in course 3 of this module (Technical School Fermentation) this comprises for example:

- selection of a suitable stirrer, determinination of required speeds and power inputs,

- observation of the flow mechanics

- measurement of the effect of viscosity on mixing time and mass transfer in model liquids

- determination of the shear sensitivity of the micro-organisms with the help of a microscope

- verification of the rules for scale-up of mixing processes.

Lehrform

In small groups the students work in parallel on various aspects of a fermentation project. In common workshops they bring these aspects together, and consolidate they knowledge in bio-engineering.

Each group selects a chairman. The chairmen of the groups coordinate the project under guidance.

Literatur

- Versuchsanleitungen, 2000

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Modulbeauftragter: Prof. Dr.-Ing. Joachim Jochum

10 Credit(s) | 10 SWS
Semester: MPE 1

Lehrveranstaltung(en):
Incineration and Vitrification (Biomass Conversion)
Sustainable Process Engineering
Technical School Thermal Treatment (Biomass Conversion)

Lernziele und Kompetenzen

Computation of the dimensioning of thermal processes: Gasification, chemical equilibrium, incineration calculation for wastes. Reduction procedures at high temperatures. Waste and biomass conversion. Glass formation and inertization by vitrification. Evaluation of procedures on their environmental compatibility. Balance of process engineering plants. The student should be able to suggest and justify for each waste a suitable procedure as well as the adequate process flowsheet. Basic knowledges in fuel engineering, planning of process and pyrometric plants as well as in thermal process engenering and reaction technology must be present.

Arbeitsaufwand

Incineration and Vitrification: 127,5 h
Technical School Thermal treatment: 120 h
Sustainable Process Engineering: 60 h
Total expenditure: 307,5 h

Zuordnung zum Curriculum

Process Engineering (Master) / Wahl

Bewertungsmodus / Erläuterung Gesamtnote

Final note of the module:
Incineration and vtrification: 40 %
Technical School Thermal treatment: 40 %
Sustainable Process Engineering: 20 %

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Vorlesung | 4 SWS
Semester: MPE 1
Klausur K90

DozentInnen:
Prof. Dr.-Ing. Joachim Jochum

Modul:
Thermal Treatment

Sprache

Anglais

Voraussetzungen

Basic knowledge in fuel engineering, in the planning of process and pyrometric plants as well as in the thermal process engineering and reaction technology must be present.

Inhalte

A) Thermal treatment in the change of the time
B) Pyrolysis (Chemie, mass and energy balance)
C) Gasification (Chemie, mass and energy balance)
D) Incineration (Chemie, mass and energy balance)
E) Vitrification
Generation of glasses, properties of glasses
processes of vitrification (Chemie, mass and energy balance)
inertisation through vitrification
potential of recyclable
F) Conversation of toxic substances through thermal processes
gaseous toxic substances
heavy metals
dioxins and furane
G) Examples for thermal treatment of waste
municipal waste
special waste
sewage sludge
mature timber
H) High temperature materials

Lehrform

In the lecture the knowledge is obtained for thermal treatment. Slides, board-wrote down, reprints and the examination questions of the earlier examinations help to a complete and authentic script including the preparation on the examination. The treated processes are completely calculated in the technical school, whereby the purchase theory practice is deepened.

Literatur

- Abfallbehandlung in thermischen Verfahren : Verbrennung, Vergasung, Pyrolyse, Verfahrens- und Anlagenkonzepte, Scholz, Reinhard, Teubner, 2001

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

- Thermische Abfallbehandlung, Urban, Arnd I, Kassel, 1997

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Seminar | 2 SWS
Semester: MPE 1
Referat

DozentInnen:
Prof. Dr.-Ing. Joachim Jochum

Modul:
Thermal Treatment

Sprache

Anglais

Voraussetzungen

Knowledge in an engineering or scientific subject, especially from fuel engineering, thermal treatment and technical chemistry.

Inhalte

Examples of topics can be: Local traffic planning; Coal gasification and waste gasification; Conversion in chlorine chemistry; Biological-mechanical waste treatment; Dioxin and Furane emissions; Airborne current gasification of sewage sludge; Hemp - a source of raw material; Waste water treatment of incineration plants; Oeko audit; Waste balances; Wood utilization; Change of heat value by pre-sorting; Recycling of used tires; Thermal insulation regulations etc..

Lehrform

Guided term paper. Each student speaks about a topic of thermal treatment or over lasting processes in process engineering. The twenty minute presentation is to rely on knowledge from the study and literature searches. Despite scientific levels it must be possible the auditory to follow the trains of thought and the conclusions. The paper should animate for the following dialogue and excursion. The themes can be suggested by the studying themselves. Paper is gradet due to the verbal presentation. Appealing and convincing lecture way are therefore particularly in demand.

Literatur

Wird in der Veranstaltung bekannt gegeben

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Labor | 4 SWS
Semester: MPE 1
Laborarbeit

DozentInnen:
Prof. Dr.-Ing. Joachim Jochum

Modul:
Thermal Treatment

Sprache

Anglais

Voraussetzungen

Lecture "Incineration and Vitrification" (Biomass Conversion) and basic knowledge in fuel engineering.

Inhalte

A) Basics brush-up
- analysis of exhaust gases by means of Orsat and process gas analysis devices
- calorific value measurments of solid, liquid and gaseous fuels
- immediatanalyse of fuels
- determination of the explosion limits

B)Thermal treatment by pyrolysis in the fixed bed
C)Thermal treatment by gasification in the pit reactor
D)Thermal treatment in the fluidized bed
E) Inertisation by vitrification and solidification
F) Balance of a firing process.

Lehrform

In the Technical School "Thermal Treatment" experiments for inertization and recycling of materials are carried out using organic waste and biomass. In addition students practise the handling of the equipment for the determination of the firing-technical characteristic values. These topics are the basics for demonstrations of pyrolysis, gasification and incineration processes.

Literatur

- Abfallbehandlung und thermische Verfahren, Scholz, Reinhard, Teubner, 2001
- Thermische Abfallbehandlung, Urban, Arnd, Kassel, 1997

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Modulbeauftragter: Prof. Dr. rer. nat. Klemens Lorenz

10 Credit(s) | 10 SWS

Semester: MPE 1

Lehrveranstaltung(en):

Safety Engineering
Technical Chemistry
Technical School Technical Chemistry
Water Processing

Lernziele und Kompetenzen

Der enge Verbund zwischen Energie, Rohstoffen, Primärchemikalien, Zwischenprodukten und Endprodukten soll am Beispiel ausgewählter großtechnischer Produktionslinien und Verfahren erarbeitet und erkannt werden.

Arbeitsaufwand

Vorlesung Technische Chemie: Anwesenheit 2*1*14h= 28h
Nachbearbeitungszeit 2*1*14*1,5h = 42h
Technikum Technische Chemie: Anwesenheit 10*7*1h= 70h
Nachbearbeitugszeit 10*2*1*2= 40h
Vorlesung Wassertechnologie: Anwesenheit 15*1h = 15h
Nachbearbeitungszeit 15*2h = 30h
Klausurvorbereitung 15h
Vorlesung Sicherheitstechnik Anwesenheit 15*1,5h = 22,5h
Nachbearbeitungszeit 15*1,5*2h = 45h

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

Siehe Studien- und Prüfungsordnung

Vorlesung | 2 SWS
Semester: MPE 1
Klausur K60

DozentInnen:
Prof. Dr.-Ing. Joachim Jochum

Modul:
Chemical Engineering

Sprache

Anglais

Voraussetzungen

Good knowledge of chemistry and equipment construction. The student must be able to read process engineering flow sheets with MSR-instrumentation.

Inhalte

A) Introduction to safety engineeing
B) general requirements of safetyfair construction
C) principles of safetyfair construction
- safety-relevant evaluation of systems - redundancy
- safetytheoretical analytical methods
D) safety engineering in selected plants (steam boiler, acetylene plants, explosive atmosphere, electrical systems, electrostatic charging)
E) safety-relevant construction units (burst disc, safety relief valves, flame safety devices).

Lehrform

In the lectures the material-chemical and safety-relevant relations are presented, developed and described on concrete basic examples. Board work and Overheadfolien are used.

Literatur

- Arbeitssicherheit, Skiba, E.Schmidt-Verlag, Bielefeld, 1991
- Betriebliche Sicherheitstechnik, Skiba, E.Schmidt-Verlag, Bielefeld, 1991

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Vorlesung | 2 SWS
Semester: MPE 1
Klausur K90

DozentInnen:
Prof. Dr. rer. nat. Klemens Lorenz

Modul:
Chemical Engineering

Sprache

Anglais

Voraussetzungen

Gute Kenntnisse der Chemie; Mindestanforderung sind der erfolgreiche Abschluss der Vorlesungen und Labore der Module 'Chemie' im Bachelor-Studiengang VT oder äquivalente Veranstaltungen.

Inhalte

A.) Die Chemische Industrie
B.) Rohstoffe und ihre Verarbeitung
C.) Primärchemikalien und ihre Gewinnung
D.) Organische Zwischenprodukte
E.) Organische Folgeprodukte

Lehrform

In den Vorlesungen werden die stofflich-chemischen und sicherheitstechnischen Zusammenhänge anhand konkreter Beispiele vorgestellt, entwickelt, beschrieben und erläutert. Dabei werden Tafelarbeit, Overheadfolien sowie Computeranimationen eingesetzt.

Literatur

- Industrielle Anorganische Chemie, K.H. Büchel, H.-H. Moretto, P. Wodisch , VCH, Weinheim, 1999
- Industrielle Organische Chemie, K. Weissermehl, H.-J. Arpe , VCH, Weinheim, 1998

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Labor | 4 SWS
Semester: MPE 1
Laborarbeit

DozentInnen:
Prof. Dr. rer. nat. Klemens Lorenz

Modul:
Chemical Engineering

Sprache

Anglais

Voraussetzungen

keine Angabe

Inhalte

Versuch 1: Rektifikation (Wärmebilanz, Trennsstufenzahl)

Versuch 2: Universalreaktor (Grundoperationen, Batch-Destillation, FällungTiefenfiltration, Zentrifugieren, Trocknung)

Versuch 3: Exotherme Reaktion, industrielle computergesteuerte Anlage

Versuch 4: Absorption Saure Gase, Reaktion mit manuell gesteuertem Universalreaktor

Lehrform

Im Praktikumsteil wird Gruppenarbeit gefordert

Literatur

Wird in der Veranstaltung bekannt gegeben

Vorlesung | 2 SWS
Semester: MPE 1
Klausur K90

DozentInnen:
Prof. Dr. rer. nat. Günter Kunz

Modul:
Chemical Engineering

Sprache

Anglais

Voraussetzungen

keine Angabe

Inhalte

A) Water Chemistry
- chemical basics
- water hardness, lime-carbonic acid equilibrium
- humic substances

B) Potable Water
- legal basics
- drainage areas for potable water, global supply
- water processing, chemical-physical and biological operations
- transport, basic materials, corrosion

C) Conditioning of Process Water
- examples on industrial water cycles

Lehrform

Traditional tools of lecturing (board, projections) incombineation with a high contingent of private study.

Literatur

- Wasseraufbereitung, Klaus Hancke, Springer Verlag, 1998

Modulbeauftragter: Prof. Dr. rer. pol. Ulrich Niemeyer

6 Credit(s) | 6 SWS
Semester: MPE 1

Lehrveranstaltung(en):
Public Relations
Technology and Society

Lernziele und Kompetenzen

Participants will be aware of the role and the responsibility which they personally will have in society due to their professional expertise and position as well as that of their (future) company. They will be equipped to be actively aware of this.
While the "Technology and Society" seminar will tend to focus on questions of content, the "Public Relations" seminar is more concerned with the methods of targeted communication.
As a prerequisite for team work, prior knowledge of a technical/engineering or scientific subject is obligatory.
A basic understanding of economic processes is also required. An interest in ethical issues and current affairs is advantageous.

Arbeitsaufwand

presence in lectures: 90 hrs
Preparation and postprocessing: 101 hrs
Total: 191 hrs

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The final grade "Mit Erfolg" ("pass") is given to students who successfully present a report within the framework of the "Technology and Society" seminar and write a term paper within the framework of the "Public Relations" seminar.

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Seminar | 2 SWS
Semester: MPE 1
Referat

DozentInnen:
Prof. Dr. rer. pol. Ulrich Niemeyer

Modul:
Business and Public Relations

Sprache

Anglais

Voraussetzungen

Prior knowledge of a technical/engineering or scientific subject is obligatory. A basic understanding of economic processes is also required. An interest in ethical issues and current affairs is advantageous.

Inhalte

A) PR tasks and instruments
B) Target groups
C) Working for the press
D) Crisis management: How do I deal with "emergencies"?

Lehrform

Participants will be given the necessary specialist information in the form of classroom discussion (e.g. on writing a press release) which will be put into practice in individual and group work, with a final presentation.

Literatur

- Einführung in den praktischen Journalismus, Walter von La Roche, 1999
- Unternehmensführung und Öffentlichkeitsarbeit. Grundlegung einer Theorie der Unternehmenskommunikation und Public Relations., Zerfaß, Ansgar , Wiesbaden, 2004

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Seminar | 4 SWS
Semester: MPE 1
Projektarbeit

DozentInnen:
Prof. Dr. rer. pol. Ulrich Niemeyer

Modul:
Business and Public Relations

Sprache

Anglais

Voraussetzungen

As a prerequisite for team work, prior knowledge of a technical/engineering or scientific subject is obligatory. A basic understanding of economic processes is also required. An interest in ethical issues and current affairs is advantageous.

Inhalte

Participants choose their own topical subjects and work on them in small groups. At the time of printing (June 2005) these topics might be e.g.: European Union guidelines on particulate matter, effluent sludge regulations in Baden-Württemberg or open-land experimentation with agricultural crops. With these examples students will discover how the results of technical research and production are received by the public, how they lead to processes which form political opinions and how these in turn have an effect on the work of the engineer in research and production. Students themselves will to some extent be qualified and prepared to adopt a position in this process, to assume an active role and to assess their professional work from the point of view of sustainability. Students will gain experience and competence in independent research and in team work. The results will be presented in the university.

Lehrform

Guided project work

Literatur

- Actual Press Releases, 2000

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Modulbeauftragter: Prof. Dr.-Ing. Ulrich Hochberg

4 Credit(s) | 4 SWS

Semester: MPE 1

Lehrveranstaltung(en):

Process Control Engineering

Lernziele und Kompetenzen

The student are able to analyse the dynamic behaviour of a process. They know how a process control system is structured, and they can define the tasks of measurement and control. They are capable of creating and programming an integrated, object orientated control system in a way to start and control a simple process.

Arbeitsaufwand

Presence during lectures: 8 * 2 = 16 h,
presence during lab: 4 * 4 = 16 h,
preparation and post-processing: 15 * 4 = 60 h,
exam preparation 2 days: 2 * 8 = 16 h.
Total 108 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is that of the K90 exam for the lecture.

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Vorlesung mit Labor | 4 SWS
Semester: MPE 1
Klausur K90

DozentInnen:
Prof. Dr.-Ing. Ulrich Hochberg

Modul:
Process Control Engineering

Sprache

Anglais

Voraussetzungen

Good knowledge of chemical and process engineering, in particular measurement and control engineering.

Inhalte

A) Introdution: process control systems, transfer functions
B) PLT-controlled presentation of processes
C) Structure of process control systems
D) Programming and creation of integrated process control systems
E) Simulation of processes

Lehrform

Lectures to impart knowledge, exercises to consolidte knowledge, lab in small groups to apply knowledge.

Literatur

Wird in der Veranstaltung bekannt gegeben

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Modulbeauftragter: Dr. Dorota Kulikowska

7 Credit(s) | 3 SWS
Semester: MPE 2

Lehrveranstaltung(en):
Analytical Training

Lernziele und Kompetenzen

In modules MPE21 to MPE27 the students are enabled to combine interdisciplinary aspects of biotechnological methods for environmental protection or reclamation. For this aim they acquire the theoretical and the practical knowledge of how to apply biotechnological methods concerning reduction or disposal of the environmental hazards. Module MPE21 contributes some of the analytical methods.

Arbeitsaufwand

Volume of lab classes: 9 hours per week during 5 weeks

Presence during classes: 9*5=45 hours
Pre- and postprocessing: 9*5*3=135 hours
Exam preparation 3 days: 3*10=30 hours
Sum 210 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is that for the laboratory report

DozentInnen:
Dr. Dorota Kulikowska

Modul:
Analytical Training

Sprache

Anglais

Voraussetzungen

Basics of biotechnology, waste water treatment and analytical methods.

Inhalte

- Chemical analysis of pollutants in water, wastewater, sewage sludge and soil: methodology

- Application of suitable laboratory equipment (chromatograph, atomic absorption spectrometer, respirometer)

- Analysis of nutrients (phosphorus,nitrogene), heavy metals and PAH (antracene and phenantrene)

Lehrform

The students work in groups of two.

Literatur

- Biotechnology, Vol.11 a-c: Environmental Processes, 2nd ed., H.-J. Rehm et al (eds.), Wiley-VCH, Weinheim, 2000
- Environmental Biotechnology. Concepts and Application, H.-J. Jördening, J. Winter (Eds.), Wiley-VCH, Weinheim, 2005
- Environmental Biotechnology. Theory and Application, G.M. Evans, J.C. Furlong (eds.), Wiley-VCH, 2002

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Modulbeauftragter: Dr. Magdalena Zielinska

7 Credit(s) | 3 SWS

Semester: MPE 2

Lehrveranstaltung(en):

Analytical Methods in Biological Systems

Lernziele und Kompetenzen

Students will work in 2-persons groups.
They learn how to control processes in biological systems, in particular the efficiency of pollutant removal from waste water, bascis of the technological conception of wastewater treatment. They deepen their ability to process data for preparation of the report. Using modern equipment the students will be up-to-date with present measurement methods in this field.

Arbeitsaufwand

volume of lab classes: 9 hours per week during 5 weeks
Presence during classes: 9*5=45 hours
Pre- and postprocessing: 9*5*3=135 hours
Exam preparation 3 days: 3*10=30 hours
Sum 210 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The mark for the module is that for the laboratory report.

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Labor | 3 SWS
Semester: MPE 2
Bericht

DozentInnen:
Dr. Magdalena Zielinska

Modul:
Analytical Methods in Biological Systems

Sprache

Anglais

Voraussetzungen

Basics of biotechnology and waste water treatment.

Inhalte

- Estimation of pollutants removal efficiency in biological systems

- Groundwater treatment and water softening by means of filtration

- Waste sorting plants and municipal landfills, waste sampling

- Effectiveness of wastewater treatment by activated sludge

- Microscopic and molecular analysis of activated sludge

Lehrform

The results obtained by 2-persons groups of students will constitute the basis for preparation of the report concerning the efficiency of the biological system in wastewater.

Literatur

- Biotechnology, Vol.11 a-c: Environmental Processes, 2nd ed., H.-J. Rehm et al (eds.), Wiley-VCH, Weinheim, 2000
- Environmental Biotechnology. Concepts and Application, H.-J. Jördening, J. Winter (Eds.), Wiley-VCH, Weinheim, 2005
- Environmental Biotechnology. Theory and Application, G.M. Evans, J.C. Furlong (eds.), Wiley-VCH, 2002

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Modulbeauftragter: Prof. Miroslaw Luczynski

4 Credit(s) | 2 SWS

Semester: MPE 2

Lehrveranstaltung(en):

Writing Scientific Papers

Lernziele und Kompetenzen

The students acquire the skills of expressing the goals of their research and the principles of how they performed their experiments, as well as of writing scientific papers.

Arbeitsaufwand

3 hours per week during 10 weeks

Presence during classes: 3*10=30 hours
Pre- and postprocessing: 3*10*3=90 hours
Sum 120 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is that for the scientific homework

Seminar | 2 SWS
Semester: MPE 2
Projektarbeit

DozentInnen:
Prof. Miroslaw Luczynski

Modul:
Writing Scientific Papers

Sprache

Anglais

Voraussetzungen

none

Inhalte

- categories of scientific publications: review, technical report, popularised article etc.

- setting up an experiment: defining aims, designing experimental strategy etc.

- components of publications: title, abstract, introduction, method, results, discussion, references, acknowledgements, figures, tables etc.

- reading, writing and publishing scientific papers

Lehrform

The seminaristic character requires the student to make his or her goals understandable to a wider audience, and to deal with its reactions.

Literatur

- handout, lecturer, -, 2000

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Modulbeauftragter: Prof. Irena Wojnowska-Baryla

6 Credit(s) | 4 SWS

Semester: MPE 2

Lehrveranstaltung(en):

Biotechnology in Environmental Protection
Water and Waste Treatment

Lernziele und Kompetenzen

This module addresses the issues of environmental protection in a multidisciplinary way.
The course "Biotechnology in Environmental Protection" focusses more the biological, chemical and physical aspects in areas like the conversion of agricultural and food industry wastes, or alternative energy sources. The course "Technology in Environmental Protection" concentrates on the engineering aspects of these processes. The students consequently learn to consider the engineering aspects of a process in environmental protection from the beginning on, even when they are analysing the biological, chemical or physical aspects.

In both courses of this module the lectures are supplemented by work in the department`s research laboratories. At the end of the courses the students will therefore be up-to-date with current research in the field of environmental protection.

Arbeitsaufwand

Biotechnology in Environmental Protection:
(classes 6 hours per week during 5 weeks)
Presence during classes: 6*5=30 hours
Pre- and postprocessing: 6*8=48 hours
Exam preparation 2 days: 2*8=16 hours
Sum 94 hours

Water and Waste Treatment:
(classes 6 hours per week during 5 weeks)
Presence during classes: 6*5=30 hours
Pre- and postprocessing: 6*8=48 hours
Exam preparation 2 days: 2*8=16 hours
Sum 94 hours

Module total 188 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is the arithmetic average of the marks of the two exams

Vorlesung mit Labor | 2 SWS
Semester: MPE 2
Klausur K60

DozentInnen:
Dr. Slawomir Ciesielski, Prof. Ewa Klimiuk

Modul:
Environmental Protection

Sprache

Anglais

Voraussetzungen

None

Inhalte

- Production of polyhydroxyalkanoates (PHAs)
- Biosynthesis of polymers (polyhydroxy acids, surface-active substances)
- Biohydrometalurgy
- Alternative energy sources
- Bioremediation due to bioaugmentation of recombined bacterial strains
- Removal of organics and heavy metals from waste water by biosorbents
- Soil washing methods for removing heavy metals
- PHA desorption

Lehrform

Lectures plus integrated laboratory

Literatur

- . Biopolymer : biology, chemistry, biotechnology, applications, S. R. Fahnestock, A. Steinbüchel, Wiley-VCH, 2003
- Biopolymers from renewable resources, D.L. Kaplan, Springer Verlag, Berlin, New York, 1998
- Bioremediation of contaminated soils, D.C. Adriano et al , Soil Science Society of America, 1999
- Bioremediation: principles and practice, Subhas K. Sikdar, Robert L. Irvine, Technomic Pub. Co., 1998

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Vorlesung mit Labor | 2 SWS
Semester: MPE 2
Klausur K60

DozentInnen:
Dr. Marek Agopsowicz, Prof. Irena Wojnowska-Baryla

Modul:
Environmental Protection

Sprache

Anglais

Voraussetzungen

Basics of biotechnology and environmental engineering

Inhalte

- Water and wastewater treatment
- Sewage sludge treatment and disposal
- Solid waste landfilling
- Solid waste composting and fermentation
- Solid waste incineration
- EIA (Environmental Impact Assessment)

Lehrform

Lectures plus integrated laboratory

Literatur

- The encyclopedia of bioprocess technology : fermentation, biocatalysis, and bioseparation, M.C. Flickinger, S.W. Drew, Wiley, New York, 1999

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Modulbeauftragter: Prof. Pawel Bruzuzan

6 Credit(s) | 5 SWS

Semester: MPE 2

Lehrveranstaltung(en):

Techniques of Genetic Engineering

Toxicology

Lernziele und Kompetenzen

Genetic engineering offers numerous prospects for example of new methods for curing illness, or making plants resistant against against plagues. The students will learn to understand the function of genes, and how they can be damaged, positively modified, and used in environmental protection.

In both courses of this module the lectures are supplemented by work in the department`s research laboratories. At the end of the courses the students will therefore be up-to-date with current research in this field.

Arbeitsaufwand

Toxicology
(6 hours per week during 5 weeks)
Presence during classes: 6*5=30 hours
Pre- and postprocessing: 6*8=48 hours
Exam preparation 2 days: 2*8=16 hours
Sum 94 hours

Techniques of Genetic Engineering:
(6 hours per week during 5 weeks)
Presence during classes: 6*5=30 hours
Pre- and postprocessing: 6*8=48 hours
Exam preparation 3 days: 2*8=16 hours
Sum 94 hours

Module Total 188 hours

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is the arithmetic average of the marks of the two exams

Vorlesung mit Labor | 3 SWS
Semester: MPE 2
Klausur K60

DozentInnen:
Dr. Slawomir Ciesielski

Modul:
Genetic Analysis

Sprache

Anglais

Voraussetzungen

Basics of Biotechnology

Inhalte

- Application of molecular techniques in environmental biotechnology for monitoring microbial systems
- Molecular approaches to the assessment of microbial community biodiversity
- Analysis of microbial activity during biological processes of wastewater treatment
- Genomic library construction of environmentally useful catabolic genes

Lehrform

Lectures supported by laboratory

Literatur

- An Introduction to Genetic Engineering, 2nd ed., S.Desmond, T.Nicholl, Cambridge University Press, 2002

Hochschule Offenburg, Fakultät Maschinenbau und Verfahrenstechnik, Badstr. 24, D-77652 Offenburg, www.fh-offenburg.de

Vorlesung mit Labor | 2 SWS
Semester: MPE 2
Klausur K60

DozentInnen:
Prof. Pawel Bruzuzan

Modul:
Genetic Analysis

Sprache

Anglais

Voraussetzungen

Basics of biotechnology

Inhalte

- Genes of eukaryotic organisms
- Gene expression
- The basics of the Polymerase Chain Reaction
- Toxicant-inducible genes
- Mutation, mutagenesis and repair of DNA damage
- Comet assay

Lehrform

Lectures supported by laboratory

Literatur

- A rapid and simple PCR-based method for isolation of cDNAs from differentially expressed genes, Sokolov, B.P., Prockop, D.J, Nucleic Acids Research, 22: 4009-4015, 1994
- PCR Protocols in Molecular Toxicology, Vanden Heuvel, J.P (ed), CRC Press LLC, pp 237, 1998
- Principles of Toxicology: Environmental and Industrial Applications, Williams, P.L., James, R.C., Roberts, S.M (eds.) , John Willey & Sons. Inc., 2000

Modulbeauftragter: Prof. Dr. rer. nat. Günter Kunz

30 Credit(s) | null SWS

Semester: MPE

Lehrveranstaltung(en):

Lernziele und Kompetenzen

The master thesis allows the student to demonstrate his or her ability to independently handle a scientific project from the area of process engineering within a limited period of time by means of scientific methods.
The resulting master thesis is defended by the student within an oral presentation of about 20 minutes duration, usually at the university of origine. This is followed by a final oral examination of about 20 minutes duration.
Examiners are all lectures of the course MPE who were also present during the presentation of the thesis.

Arbeitsaufwand

Work for master-Thesis:
18 weeks * 5 days * 8 working hours = 720 h
Post-processing, including writing the thesis, plus preparation of the oral presentation and the final oral exam:
4,5 weeks* 5 days * 8 working hours = 180 h.
Module total: 900 h

Zuordnung zum Curriculum

Process Engineering (Master) / Pflicht

Bewertungsmodus / Erläuterung Gesamtnote

The module mark is calculated by the supervising lecturer as follows:
50% mark for the written thesis
25% oral presentation of the thesis
25% final oral exam

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