Course Prefix, Number, Title, Credit Hours: EXCH 489, Student Exchange – International (3-0) 3

University Name: South Dakota School of Mines and Technology

Academic Term, Year: Spring 2020

Course Meeting Time and Location: 24 Feb – 13 Mar 2020, Technical University Darmstadt (TUDa) Campus, Darmstadt, Germany

Instructors Contact Information

Name: David Dixon; Travis Walker david.dixon@sdsmt.edu travis.walker@sdsmt.edu
Office location: CBEC-2209 (SDSMT); TBA on Lichtwiese Campus (TUDa)
Office hours: by appointment
Phone number: Dr. Dixon mobile: +1 605-215-9729, DE cell: +49 (0) 151 2176 1477
TA: Sidney Vondra; sidney.vondra@mines.sdsmt.edu

Course Description

Catalog description: This course allows students to register as full- time students while taking part in an Exchange Program. Students will register on their home campus for the number of credit hours they intend to take while enrolled at another campus.
Additional course description (optional): Students will be enrolled in an Advanced Design Project (ADP) course at the Technical University of Darmstadt. This course is a 6 ECTS (European Credit Transfer System), which will be counted by transfer to be equivalent to 3 credit hours at SDSMT. The typical SDSMT courses that this ADP course will transfer to are CBE 466 (2) Capstone Design Chemical Engineering, and CBE or DAE elective (1) although other courses may be considered by the student's advisor and the department.

Course Prerequisites

Previous courses/experience suggested: CBE 317, CBE 321, CBE 318 or CBE 417, CBE 343.
Technology skills: Students should have a working knowledge of material and energy balances, phase equilibrium calculations, heat and mass transfer, chemical reaction engineering. It is helpful if they have an understanding of basic engineering economics and should be familiar with setting up and running basic AspenPlus blocks.

Description of Instructional Methods: The main type of instructional method utilized in this class is group design work augmented with in-class lectures/tutorials, as needed. Communication technologies available in the classroom provided will be utilized as needed.

Course Requirements

Required textbook(s) and other materials:

- none

Supplementary materials suggested:

- access to texts related to senior design, and the technology skills listed above;
- access to tablet computer running the latest SDSMT version of AspenPlus.

Class attendance policy

Students are expected to attend the design sessions and meetings, as required by the host university.

Cheating and plagiarism policy

See current SDSMT catalog: Policy Governing Academic Integrity

Make-up policy

If a class meeting or deadline is missed due to pre-planned or unforeseen circumstances the instructors should be contacted as soon as possible to arrange for possible makeup work. Late work is not accepted for full credit, except under extenuating circumstances.

Course Goals

Include specific reference to System General Education Goals if applicable.

Students in this course should expect to:

- solidify your knowledge of chemical engineering fundamentals
- apply your knowledge of chemical engineering, chemistry, mathematics, economics, sociopolitical, and ethical factors to the design of chemical processes/plants;
- critically review design alternatives, and select the best alternative based on soundness of design, operability, safety, environmental, and economic considerations;
- gain an appreciation of current chemical engineering related issues around the globe;
- gain an appreciate of the field of chemical engineering from perspectives around the world;
- gain an appreciation of societal issues for which chemical engineering may have an impact.

Student Learning Outcomes:

After completion of this course the average student is expected to be able to:

1. develop a process design package including BFD, PFD, and or P&ID(s);
2. complete key elements of a process design package that includes selected equipment design;
3. use process simulators, where available/required, to aid in the process synthesis and design;
4. obtain required design data and information from appropriate literature;
5. work effectively as individuals and contribute effectively to the team's success as a design group member;
6. effectively communicate your design in written and presentations;
7. identify and analyze issues that can develop when working in multi-disciplinary and multi-cultural teams;
8. identify similarities and differences affecting the global practice of chemical engineering.

Evaluation Procedures

Assessments, tests, projects, assignments, etc.

This course, since it is offered under the auspices of the TU Darmstadt, is formally evaluated by the ADP project team and a European grade will be assigned. There are daily and project deliverables that will be clarified by the ADP project leadership, which may include (but not be limited to) the following:

- daily team progress and report;
- individual and team attendance and performance;
- team final written design report/package;
- team oral presentation at an industrial facility (evaluated by the ADP project team and the industrial engineers/managers).

Additional specific SDSMT CBE requirements include:

- create and present a poster based on your team's final design at the SDSMT design fair, scheduled on TBA April 2020, from 9am – 2pm; format/content TBA;
- an individual memo that addresses (Due: 3 April 2020):
    - similarities and differences noted in the engineering practices between German and USA engineering;
    - cultural and societal similarities and differences between Germany and the United States that you noticed or experienced;
    - your thoughts and reflections on what the ADP 2020 course meant to you, what you learned, highlights, good and not so good things, how this experience might be improved or suggested changes, and how it might help you in your job or future.

Performance standards/grading policy

Final grading of the ADP course taken at the TU Darmstadt will be by TUDa and provided back to the department and students in the form of a TU Darmstadt transcript. Typical German grades are: 1,00 = top grade; 5,00 = failed grade.

As per SDSMT policy, the German grade will be transferred back and translated into an SDSMT grade. However, the above SDSMT CBE requirements must be completed as well to earn a passing grade.

ADA Statement

Students with special needs, accessibility issues, or requiring special accommodations should contact the instructor and the Title IX and Disability Coordinator, Ms. Amanda Lopez, at disabilityservices@sdsmt.edu.edu or 394-2533.

Freedom in Learning Statement

Freedom in learning. *Under Board of Regents and University policy student academic performance may be evaluated solely on an academic basis, not on opinions or conduct in matters unrelated to academic standards. Students should be free to take reasoned exception to the data or views offered in any course of study and to reserve judgment about matters of opinion, but they are responsible for learning the content of any course of study for which they are enrolled. Students who believe that an academic evaluation reflects prejudiced or capricious consideration of student opinions or conduct unrelated to academic standards should contact the Provost and Vice President for Academic Affairs to initiate a review of the evaluation.*

Electronic Devices Policy

Professional decorum.

Tentative Course Schedule

- Plan to arrive at Darmstadt, Germany, no later than Sunday, 23 February 2020. If it is possible, and **it is strongly encouraged**, to arrive by Saturday, 22 February 2020. The youth hostels charges are covered for you from 22 Feb 2020 arrival to departure on Sunday 16 March 2020. If you arrive earlier and/or depart later you should plan on covering your own lodging. The accommodations in Darmstadt will be at the DJH Jugendherberge Darmstadt, Landgraf-Georg-Strasse 119, 64287 Darmstadt, Germany. (+49 6151 45293) Website: http://www.jugendherberge.de/en/youth-hostels/darmstadt476/shortportraet. Breakfast at the hostel begins at 7am daily.
- ADP design class begins on Monday, 24 February 2020. Time and location to be announced (TBA), but likely the time will be at 8am.
- Lunch is on your own, but most teams go to the Mensa, which is good and inexpensive.
- ADP design class occurs from 24 February – 06 March 2020. The weekend in between the two work weeks is free time. Cultural tours are available, if desired.
- The third week of the ADP will include time to finalize the design and written reports, prepare the oral presentation, and work on each team's design fair poster. There will be an organized trip and plant visit to an operating industrial facility, where the oral presentation will be made. Sturdy shoes and long pants should be worn for the industrial plant tour, similar to any USA plant tour. Currently the industrial tour (TBA) is arranged for some time during the week of 9-13 March 2020, however this is subject to change.
- The earliest departure from Darmstadt, Germany, should be the day after the tour returns to Darmstadt….more details will be forthcoming.
- Senior Design Fair is tentatively scheduled for some time in April 2020 from 9:00 – 14:00. All team members should plan on participating.

Additional Course Information

Since this is a school sponsored event, the EXCH instructor will send an email to your other course instructors informing of the timing of this course.

NOTE: Please insure you have made contact with your other course instructors to work ahead, cover, or make up any material you may be missing before or after spring break, when you are participating in this course.

RELATION OF COURSE OUTCOMES TO PROGRAM OUTCOMES (2017 -):

The following table indicates the relative strengths of each course outcomes in addressing the program outcomes (on a scale of 1 to 4 where 4 indicates a strong emphasis)

EXCH 489		ChE Student Outcomes										
		a	**b**	**c**	**d**	**e**	**f**	**g**	**h**	**i**	**j**	**k**
Course Outcomes	**1.**			4								
	2.			4								
	3.											4
	4.			2		2						
	5.				4							
	6.							4				
	7.				3				3			
	8.								4			

*List of Program Outcomes:

Student Outcomes:

a. Ability to apply mathematics, science and engineering principles.
b. Ability to design and conduct experiments, analyze and interpret data.
c. Ability to design a system, component, or process to meet desired needs.
d. Ability to function on multidisciplinary teams.
e. Ability to identify, formulate and solve engineering problems.
f. Understanding of professional and ethical responsibility.
g. Ability to communicate effectively.
h. The broad education necessary to understand the impact of engineering solutions in a global and societal context.
i. Recognition of the need for and an ability to engage in life-long learning.
j. Knowledge of contemporary issues.
k. Ability to use the techniques, skills and modern engineering tools necessary for engineering practice.

Course Outcomes:

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Revised Aug 2007 from BOR June 2004