303
a, b

RECEIVED
JAN 5 2012
WSU Registrar

Washington State University
MAJOR CURRICULAR CHANGE FORM - - COURSE
(Submit original signed form and ten copies to the Registrar's Office, zip 1035.)

Future Effective Date: 08/24/2012 ☐ New course ☐ Temporary course ☐ Drop service course
(effective date cannot be retroactive) ☐ There is a course fee associated with this course (see instructions)

☐ Variable credit _____ ☐ Repeat credit (cumulative maximum _____ hours)

☐ Increase credit (former credit _____) ☐ Lecture-lab ratio (former ratio _____)

☐ Number (former number _____) ☐ Prefix (former prefix _____)

☐ Crosslisting (between WSU departments) **(Must have both departmental signatures)** ☐ Cooperative listing (UI prefix and number _____)
taught by: WSU ☐ UI ☐ jointly taught ☐

☑ Conjoint listing (400/500) ☐ S, F grading

☐ Request to meet Writing in the Major [M] requirement **(Must have All-University Writing Committee Approval)**

☐ Request to meet GER in _____ **(Must have GenEd Committee Approval)** ☐ Fulfills GER lab (L) requirement

☐ Professional course **(Pharmacy & Vet Med only)** ☐ Graduate credit **(professional programs only)**

☐ Other (please list request) _____

a b

ENGR	420/520	Multidisciplinary Engineering Design I
course prefix	course no.	title

3	1	4		Senior or Graduate Standing
credit	lecture hrs per week	lab hrs per week	studio hrs per week	prerequisite

Description (**20 words or less**) ~~We would like to include graduate students in this course since it has a major research component.~~ see email

Instructor:	Karl Olsen/Cara Poor	Phone number:	3354547	Email: cpoor@wsu.edu
Contact:	_____	Phone number:	3350373	Email: kolsen@wsu.edu
Campus Zip Code:	_____			

- Please attach rationale for your request, a current and complete syllabus, and explain how this impacts other units in Pullman and other branches (if applicable).
- Secure all required signatures and provide 10 copies to the Registrar's Office.

Robert M Olen 12/23/11 — Chair/date

Robert M Olen 1/3/12 — Dean/date

_____ — General Education Com/date

_____ — Chair (if crosslisted/interdisciplinary)*

_____ — Dean (if crosslisted/interdisciplinary) *

_____ — Graduate Studies Com/date

_____ — All-University Writing Com/date

_____ — Academic Affairs Com/date

_____ — Senate/date

***If the proposed change impacts or involves collaboration with other units, use the additional signature lines provided for each impacted unit and college.**

ENGR 420/520 (421/521) Major Change Form

Description: Needs analysis and conceptualization of technological products and business plan for target market; multidisciplinary team development.

Rationale:

Increasingly, design projects involve teams composed of multiple disciplines working towards a common goal. Traditionally, engineers, architects, and other disciplines have difficulty communicating and working together that stems from a lack of knowledge of the others capabilities, role, and terminology. This course fills the need for improving interdisciplinary communication and cooperative work skill for solving real problems. Students are presented a client-based project provided by a city, state, or industrial entity. The interdisciplinary nature of the class attracts many design students across campus.

This course is currently listed as ENGR 420 (421) and employs context-based learning methods to teach design techniques, product development, and business plans. Students complete the portion of design that is within their discipline. The course is taught in 2 semesters; in ENGR 420 the students learn problem synthesis, data analysis, and the conceptual design process. In ENGR 421, the students learn the design process. We would like to make ENGR 420 (421) a 400/500 level class to include graduate students. There is a major research component in using cutting edge design techniques and product development. In the past 2 years, we have included graduate students in the course through the advanced topics listing. Many of these graduate students have gone on to do research on an aspect of the IDeX design project. The major difference between 420 (421) and 520 (521), as highlighted in the syllabus, is the additional requirement that graduate students lead discussions on at least 5 research papers that are related to the project. They will then develop a proposal for further research that will be presented to the class. Undergraduate students are expected to read the papers and ask the graduate students questions. As a result of this activity, the students become motivated to create innovative, unique designs to address the client's needs. Research projects are also developed using the student proposals.

This course falls under the ENGR prefix because it is truly multidisciplinary; students from civil engineering, construction management, architecture, agriculture sciences, landscape architecture, and mechanical engineering take this course. The design disciplines (landscape architecture, architecture, and interior design) are losing the courses taught for their PhD programs. This class provides an enriched experience for those with less course options. There are few conjoint classes taught in engineering and architecture (i.e., of the 16 architecture graduate courses, none of them are conjoint, and only 9 of the 57 graduate courses taught in civil engineering are conjoint). This course is unique from the typical classes taught in each discipline due to the nature of the design projects and realistic experience gained from working with other disciplines as well as an actual client. Graduate and undergraduate students alike gain hands-on experience in design. A mix of undergraduate and graduate students is beneficial; undergraduate students concentrate on the basic design of the project and graduate students use current research to come up with innovative designs (that then need further testing). There are multiple benefits to making this course conjoint, and graduate students from all disciplines should be able to experience this class.

ENGR 420

IDeX - Integrated Design Experience

PROFESSORS

Karl Olsen
E-mail: kolsen@wsu.edu
Phone: (509) 335-0373
Office: Sloan 127
Office Hours: M-F 10:00 a.m. to 11:00 a.m.
* Or by appointment

Cara Poor
E-mail: cpoor@wsu.edu
Phone: (509) 335-4547
Office: Sloan 118
Office Hours: M, W, Th 12:30-2
* Or by appointment

Michael Wolcott
E-mail: wolcott@wsu.edu
Phone: (509) 592-4757
Office: Sloan 113
Office Hours: By Appointment

PURPOSE OF COURSE

The goals for this class are to have every student exit with strong collaborative research, questioning, and analysis methods to utilize in their academic and professional work. The focus will be on developing the tools that lead to open-source design thinking processes, fostering innovation across multiple disciplines of research and practice.

At the completion of this course students should be able to:

- Clearly identify the goals of a design project
- Research and analyze current site conditions
- Map a resource flow specific to a project goal
- Investigate current practices pertaining to the project
- Work collaboratively in interdisciplinary teams on the project.
- Develop innovative ideas for achieving the specific goals for the project
- Construct a conceptual design that effectively satisfies each of the project goals
- Clearly present the conceptual design to a professional audience.

COURSE SCHEDULE

WEEK 1	TUESDAY	THURSDAY
1	Open House	Project Intro and Goals
2	Site Analysis	Site Analysis Presentations
3	Site Visit	Resource Flows I (Applicable to Goals)
4	Resource Flows II	Resource Flows III
5	Stormwater I	Stormwater II
6	Stormwater III	Hydrology I
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8	Ecology I	Ecology II
9	Ecology III	Transportation I
10	Transportation II	Transportation III
11	Introduction to Conceptual Design	Conceptual Design Idea Evaluation
12	Conceptual Design Selection I	Conceptual Design Development II
13	Conceptual Design Development I	Conceptual Design Development II
	THANKSGIVING	
14	Conceptual Design Development III	Conceptual Design Documentation I
15	Conceptual Design Documentation II	Conceptual Design Documentation III
16	Conceptual Design Presentation	

ASSESSMENTS

Student understanding of the material will be assessed with the following distribution:

Assignments	35 %
Participation	15 %
Sustainability Readings	10 %
Research Paper Discussions	10 %
Conceptual Designs	30 %

ASSIGNMENTS — *35 % of Final Grade*

Throughout the course of the class several miscellaneous assignments will be required. These include the following:

- Discipline Descriptions
- Site Analysis
- Resource Flow Analysis
- Hydrologic Analysis
- Traffic Flow/Transportation Analysis
- Others to be assigned throughout the course of the semester

PARTICIPATION — *15 % of Final Grade*

Due to the nature of the IDeX studio the coursework is highly group oriented. In light of this fact each student will be graded upon their individual participation in the class. The professors as well as the group members will grade each of the students on their participation. This includes class attendance, participation in group discussions, and involvement in group projects.

SUSTAINABILITY READINGS — *10 % of Final Grade*

During the first half of the semester the class will be participating in the "World of Health: Sustainable Systems at Work" reading series. This reading series includes five (5) sessions each consisting of 4 to 5 articles on a given topic of sustainability. Each session will include a group discussion, which is intended to assist in further understanding the topic of sustainability as well as understanding the perspectives of the other students in the group. Each student will be responsible for:

1. Reading each session before the corresponding discussion group
2. Participating in group discussion
3. Facilitate one of the group discussions

RESEARCH PAPER DISCUSSIONS — *10% of Final Grade*

To facilitate innovative, multidisciplinary design, students will participate in discussions on research papers related to the goals of the project that may affect the design. Current research in stormwater, hydrology, water quality, ecology, and related topics as applicable to specific disciplines will be investigated and discussed in groups. Students will be graded based on their participation in group discussions.

CONCEPTUAL DESIGN — *30% of Final Grade*

The conceptual design will cover the last half of the semester. During this portion of the class we will use the information gathered during the analysis portion of the class and develop possible solutions. At the end of the semester the students will present a complete conceptual design detailing their ideas.

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EVALUATION

Final grades will be assigned on the following standard scale based on total points earned in the course. Note that everyone in the course has the opportunity to earn an A. The instructor reserves the right to adjust the scale accordingly at the end of the semester to ensure that an appropriate allocation of grades is obtained, although grades will not be dropped lower. Final grades will be based on the following breakdown:

93-100%	A	77-80%	C+
90-93%	A-	73-77%	C
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83-87%	B	60-70%	D
80-83%	B-	< 60%	F

ACADEMIC HONESTY

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STUDENTS WITH DISABILITIES

Students with Disabilities: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Admin Annex Bldg, Room 205). Please stop by or call 509-335-3417 to make an appointment with a disability specialist.

CAMPUS SAFETY

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ENGR 520

IDeX - Integrated Design Experience

PROFESSORS

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E-mail: kolsen@wsu.edu
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ASSESSMENTS

Student understanding of the material will be assessed with the following distribution:

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Participation	10 %
Sustainability Readings	10 %
Research Paper Discussions and Proposal	25 %
Conceptual Designs	25 %

ASSIGNMENTS — *30 % of Final Grade*

Throughout the course of the class several miscellaneous assignments will be required. These include the following:

- Discipline Descriptions
- Site Analysis
- Resource Flow Analysis
- Hydrologic Analysis
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- Others to be assigned throughout the course of the semester

PARTICIPATION — *10 % of Final Grade*

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SUSTAINABILITY READINGS — *10 % of Final Grade*

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1. Reading each session before the corresponding discussion group
2. Participating in group discussion
3. Facilitate one of the group discussions

RESEARCH PAPER DISCUSSIONS AND PROPOSAL — *25% of Final Grade*

****unique to the graduate level course****

To facilitate innovative, multidisciplinary design, students will search for and present at least 5 research papers related to the goals of the project that may affect the design. Current research in stormwater, hydrology, water quality, ecology, and related topics as applicable to specific disciplines will be investigated and discussed in groups. Graduate students will lead discussions on their chosen research papers and be evaluated by their peers (5%) as well as instructors (10%) based on:

- Paper selection (applicability to project, discipline)
- Presentation quality
- Participation in other students' discussions

Based on these and other research papers, graduate students will develop and present a proposal for further research and present to the class (10%). Further details on the structure and presentation of the proposal will be provided in a separate handout.

CONCEPTUAL DESIGN — *25% of Final Grade*

The conceptual design will cover the last half of the semester. During this portion of the class we will use the information gathered during the analysis portion of the class and develop possible solutions. At the end of the semester the students will present a complete conceptual design detailing their ideas.

EVALUATION

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#303/04

Devine, Lisa

From: Charlotte Omoto <omoto@wsu.edu>
Sent: Monday, February 13, 2012 9:27 AM
To: Devine, Lisa; Edwards, Charles Gould; Evans, Marc A.; Gursoy, Dogan; Johnson-Shull, Lisa Ann; Oakley, Christine Kay; Omoto, Charlotte K; Parker, Jane; Wherland, Scot; Zlatos, Christy
Subject: #303 & 304
Attachments: #303&304.doc

Cats,

Attached is the information for Engr 420/520 and 421/521.

Charlotte

Begin forwarded message:

> From: "Poor, Cara" <cpoor@wsu.edu>
> Date: February 10, 2012 9:52:27 AM PST
> To: "Omoto, Charlotte K" <omoto@wsu.edu>
> Cc: Karl Olsen <kolsen@idexstudio.org>
> Subject: 420/520 description
>
> Dear Dr. Omoto,
>
> Apologies for the error. The description should read:
>
> 420/520:
> Course Prerequisite: Senior or Graduate standing; certified
> engineering major.
> Needs analysis and conceptualization of technological products and
> business plan for target market; multidisciplinary team development.
>
> 421/521:
> Course Prerequisite: Senior or Graduate standing; certified
> engineering major.
> Prototype solution developed and evaluated and business plan
> completed; presentation to stake holders; team development and
> Assessment.
>
> Thank you,
> Cara
>
> Cara Poor, P.E., Ph.D.
> Clinical Assistant Professor | Department of Civil and Environmental
> Engineering
> Phone: (509) 335-4547 | E-mail: cpoor@wsu.edu | Office: Sloan
> 118
>
>
>
>
>
> On 2/9/12 3:40 PM, "Charlotte Omoto" <omoto@wsu.edu> wrote:

>
> Dear Dr. Olsen and Poor,
>
> Catalog subcommittee will be reviewing your course proposal for Engr
> 420/520 and 421/521 next Thursday.
>
> On the coversheet for the Major Curricular Change form under
> Description, you wrote "We would like to include graduate students in
> this course since it has a major research component."
>
> Please note that the Description is not a rationale but what you
> would like printed for the description of the course.
>
> Currently for 420 the catalog description reads:
> Course Prerequisite: Senior standing; certified engineering major.
> Needs analysis and conceptualization of technological products and
> business plan for target market; multidisciplinary team development.
>
> 421 catalog description reads:
> Course Prerequisite: Senior standing; certified engineering major.
> Prototype solution developed and evaluated and business plan
> completed; presentation to stake holders; team development and
> assessment.
>
> Please use the current description and strike out what you want to
> delete and underline any added wording. You may just send the new
> description to me via e-mail.
>
> Thank you for your attention to our request.
>
> Charlotte K. Omoto
> Professor
> School of Biological Sciences
> 113 Heald Hall
> Washington State University
> Pullman, WA 99164-4236
>
> phone (509)335-5591
> fax (509)335-3184
>
>
>

420/520:
Course Prerequisite: Senior or Graduate standing; ~~certified engineering major.~~
Needs analysis and conceptualization of technological products and business plan for target market; multidisciplinary team development.

421/521:
Course Prerequisite: Senior or Graduate standing; ~~certified engineering major~~.
Prototype solution developed and evaluated and business plan completed; presentation to stake holders; team development and Assessment.

Students from other majors (architecture, agriculture science, economics, etc.) take our course. We did not want the certified engineering major to prevent the multi-disciplinary nature of the class. Thus, we no longer require students to be a certified engineering major to take this course.

Each course is a stand alone course. Although we strongly encourage the students to take both, the 420/520 course is not a prerequisite for 421/521.

303 a/b

304 a/b

Devine, Lisa

From: Poor, Cara
Sent: Tuesday, February 21, 2012 10:12 AM
To: omoto@mail.wsu.edu
Cc: Devine, Lisa; Evans, Marc A.
Subject: Re: Engr 420/520 & 421/521
Attachments: 421-521 form.pdf; 420-520 form.pdf; ENGR 420 Syllabus.pdf; ENGR421 Syllabus.pdf; IDeX-ENGR520CourseChangeRationale.pdf; ENGR 520 Syllabus.pdf; ENGR521 Syllabus.pdf

Thank you for allowing us to make corrections to our syllabus and forms.
Attached are the updated syllabi, rationale form, and course change form.
I did not obtain new signatures; please let me know if that is necessary.

Regards,
Cara

On 2/21/12 9:26 AM, "omoto@mail.wsu.edu" <omoto@mail.wsu.edu> wrote:

>Hello Cara,
>
>If you can send it to me and copy Lisa Devine (larmy@wsu.edu) and Marc
>Evans (marcevan@wsu.edu) we can discuss it this coming Thursday.
>
>Thank you!
>Charlotte
>
>> Hi Charlotte,
>>
>> Yes, "field trip required" should be added to the description.
>>
>> I will update the syllabus so 421 adds up to 100%, 420 is
>> Multidisciplinary Engineering Design I, and the disability statement
>> is updated.
>>
>> Do you need me to resubmit these documents?
>>
>> Thank you,
>> Cara
>>
>> On 2/16/12 1:58 PM, "omoto@mail.wsu.edu" <omoto@mail.wsu.edu> wrote:
>>
>>>Hello Cara,
>>>
>>>The Catalog Subcommittee was interested to know whether the site
>>>visit listed in 420/520 involves field trip. If it does, then the
>>>phrase "field trip required" needs to be included in the description.
>>>
>>>A few minor points, we notice that the % on 421 adds up to 105%.
>>>Please take off 5% from one of the items. We also note that both
>>>course titles are the same. I assume 420 should be Multidisciplinary
>>>Engineering Design I. We also note that the Disability Statement in

>>>420/520 is the old one.
>>>
>>>Thanks for your attention to our query.
>>>
>>>Charlotte Omoto
>>>
>>
>>
>
>

303

ENGR 420

IDeX - Integrated Design Experience I

PROFESSORS

Karl Olsen
E-mail: kolsen@wsu.edu
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ENGR 520

IDeX - Integrated Design Experience I

PROFESSORS

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PURPOSE OF COURSE

The goals for this class are to have every student exit with strong collaborative research, questioning, and analysis methods to utilize in their academic and professional work. The focus will be on developing the tools that lead to open-source design thinking processes, fostering innovation across multiple disciplines of research and practice.

At the completion of this course students should be able to:

- Clearly identify the goals of a design project
- Research and analyze current site conditions
- Map a resource flow specific to a project goal
- Investigate current practices pertaining to the project
- Work collaboratively in interdisciplinary teams on the project.
- Develop innovative ideas for achieving the specific goals for the project
- Construct a conceptual design that effectively satisfies each of the project goals
- Clearly present the conceptual design to a professional audience.

COURSE SCHEDULE

WEEK 1	TUESDAY	THURSDAY
1	Open House	Project Intro and Goals
2	Site Analysis	Site Analysis Presentations
3	Site Visit	Resource Flows I (Applicable to Goals)
4	Resource Flows II	Resource Flows III
5	Stormwater I	Stormwater II
6	Stormwater III	Hydrology I
7	Hydrology II	Hydrology III
8	Ecology I	Ecology II
9	Ecology III	Transportation I
10	Transportation II	Transportation III
11	Introduction to Conceptual Design	Conceptual Design Idea Evaluation
12	Conceptual Design Selection I	Conceptual Design Development II
13	Conceptual Design Development I	Conceptual Design Development II
	THANKSGIVING	
14	Conceptual Design Development III	Conceptual Design Documentation I
15	Conceptual Design Documentation II	Conceptual Design Documentation III
16	Conceptual Design Presentation	

ASSESSMENTS

Student understanding of the material will be assessed with the following distribution:

Assignments	30 %
Participation	10 %
Sustainability Readings	10 %
Research Paper Discussions and Proposal	25 %
Conceptual Designs	25 %

ASSIGNMENTS — *30 % of Final Grade*

Throughout the course of the class several miscellaneous assignments will be required. These include the following:

- Discipline Descriptions
- Site Analysis
- Resource Flow Analysis
- Hydrologic Analysis
- Traffic Flow/Transportation Analysis
- Others to be assigned throughout the course of the semester

PARTICIPATION — *10 % of Final Grade*

Due to the nature of the IDeX studio the coursework is highly group oriented. In light of this fact each student will be graded upon their individual participation in the class. The professors as well as the group members will grade each of the students on their participation. This includes class attendance, participation in group discussions, and involvement in group projects.

SUSTAINABILITY READINGS — *10 % of Final Grade*

During the first half of the semester the class will be participating in the "World of Health: Sustainable Systems at Work" reading series. This reading series includes five (5) sessions each consisting of 4 to 5 articles on a given topic of sustainability. Each session will include a group discussion, which is intended to assist in further understanding the topic of sustainability as well as understanding the perspectives of the other students in the group. Each student will be responsible for:

1. Reading each session before the corresponding discussion group
2. Participating in group discussion
3. Facilitate one of the group discussions

RESEARCH PAPER DISCUSSIONS AND PROPOSAL — *25% of Final Grade*

****unique to the graduate level course****

To facilitate innovative, multidisciplinary design, students will search for and present at least 5 research papers related to the goals of the project that may affect the design. Current research in stormwater, hydrology, water quality, ecology, and related topics as applicable to specific disciplines will be investigated and discussed in groups. Graduate students will lead discussions on their chosen research papers and be evaluated by their peers (5%) as well as instructors (10%) based on:

- Paper selection (applicability to project, discipline)
- Presentation quality
- Participation in other students' discussions

Based on these and other research papers, graduate students will develop and present a proposal for further research and present to the class (10%). Further details on the structure and presentation of the proposal will be provided in a separate handout.

CONCEPTUAL DESIGN — *25% of Final Grade*

The conceptual design will cover the last half of the semester. During this portion of the class we will use the information gathered during the analysis portion of the class and develop possible solutions. At the end of the semester the students will present a complete conceptual design detailing their ideas.

EVALUATION

Final grades will be assigned on the following standard scale based on total points earned in the course. Note that everyone in the course has the opportunity to earn an A. The instructor reserves the right to adjust the scale accordingly at the end of the semester to ensure that an appropriate allocation of grades is obtained, although grades will not be dropped lower. Final grades will be based on the following breakdown:

93-100%	A	77-80%	C+
90-93%	A-	73-77%	C
87-90%	B+	70-73%	C-
83-87%	B	60-70%	D
80-83%	B-	< 60%	F

ACADEMIC HONESTY

All members of the University community share responsibility for maintaining and promoting the principles of truth and academic honesty. The University has a policy defining academic dishonesty and procedures to follow when dishonesty occurs. This policy applies to everyone and thus copying, plagiarism, and other forms of cheating will not be tolerated. The policy and procedures can be found in the Student Handbook and on-line at www.studentaffairs.wsu.edu. If a student is caught cheating a report describing the incident will be sent to student affairs, the chair of your department, and the dean of the College of Engineering.

STUDENTS WITH DISABILITIES

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