

Ogden College of Science and Engineering
Western Kentucky University
Office of the Dean
745-6371

REPORT TO THE GRADUATE COUNCIL CURRICULUM COMMITTEE

DATE: December 14, 2016

FROM: Ogden College of Science and Engineering

Ogden College of Science and Engineering Committee Members: Dr. Fred DeGraves, Dr. John Khouryieh, Dr. Michael Smith, Dr. Eric Conte, Dr. Mustafa Atici, Dr. Shane Palmquist, Dr. David Keeling, Dr. Dominic Lanphier, Dr. Sanju Gupta, Dr. Sharon Mutter

Chair: Dr. Cathleen Webb

The Ogden College of Science and Engineering submits the following item for consideration at the October Meeting.

Action	Proposal to Revise a Course CHEM 516 Contact Person: Eric Conte, eric.conte@wku.edu , 56019
Action	Proposal to Revise a Course CHEM 588 Contact Person: Eric Conte, eric.conte@wku.edu , 56019
Action	Proposal to Revise a Program Ref: 059, Chemistry Masters of Science Thesis Concentration Contact Person: Eric Conte, eric.conte@wku.edu , 56019
Action	Proposal to Revise a Program Research Intensive Thesis Concentration Contact Person: Eric Conte, eric.conte@wku.edu , 56019
Action	Proposal to Create a New Course CHEM 585 Contact Person: Eric Conte, eric.conte@wku.edu , 56019
Action	Proposal to Create a New Course PHYS 565 Contact Person: Ali Er, ali.er@wku.edu , 56202

MINUTES – OCSE Graduate Curriculum Committee

November 9, 2016

Members Present: Dr. Fred DeGraves, Dr. John Khouryieh, Dr. Mustafa Atici, Dr. Shane Palmquist, Dr. David Keeling, Dr. Dominic Lanphier, Dr. Sanju Gupta

Dr. Cathleen Webb, Chair

Meeting was held via email

OLD BUSINESS

Keeling/Gupta made a motion to approve the minutes from October. Approved unanimously.

NEW BUSINESS

Consent Item

No consent items on the agenda

Action Agenda

Keeling/Gupta made a motion to approve the action item. Approved unanimously.

Proposal to Create a New Certificate Program – Graduate Certificate in Biology

**Revise a Course
(Action)**

Date:

College, Department: Ogden, Chemistry

Contact Person: Eric Conte, eric.conte@wku.edu, 56019

1. Identification of course

1.1 Course prefix (subject area) and number: CHEM 516

1.2 Course title: Laboratory Investigations

2. Proposed change(s):

2.1 course number:

2.2 course title: Literature Review

2.3 credit hours: 2

2.4 grade type: letter

2.5 prerequisites:

2.6 corequisites:

2.7 course description:

Students will prepare a thorough review paper related to his/her thesis topic. The instructor will provide guidance on literature retrieval and paper formatting. The student's research advisor will guide the student on a suitable title and references. The student's research advisor will be consulted by the instructor of record on the quality of the review paper and a final grade. It is intended that the final draft of this paper be suitable for submission to a peer reviewed journal.

3. Rationale for revision of course: The current course title and description do not match.

Current listing: Laboratory Investigations

Review of chemical literature on topics of individual interest. Includes reports and proposals for further research.

The title has been modified to better fit the course description and more details has been added to the course description

4. Term of implementation: Fall 2017

5. Dates of committee approvals:

Department

12/2/2016

College Curriculum Committee

Professional Education Council (if applicable)

Graduate Council Curriculum Committee

Graduate Council

University Senate

***New course proposals require a Course Inventory Form be submitted by the College Dean's office to the Office of the Registrar.*

**Revise a Course
(Action)**

Date:

College, Department: Ogden, Chemistry

Contact Person: Eric Conte, eric.conte@wku.edu, 56019

1. Identification of course

- 1.1 Course prefix (subject area) and number: CHEM 588
- 1.2 Course title: Research Proposal

2. Proposed change(s):

- 2.1 course number:
- 2.2 course title: Independent Research Proposal
- 2.3 credit hours: 2
- 2.4 grade type: letter
- 2.5 prerequisites:
- 2.6 corequisites:
- 2.7 course description:
- 2.8 other:

3. **Rationale for revision of course:** We are currently proposing a new course CHEM 585 that we wish to name Research Proposal. Independent Research Proposal would more align with students taking this course (CHEM 588) in the Research Intensive Program.

4. **Term of implementation: Fall 2017**

5. Dates of committee approvals:

Department	12/2/2016
College Curriculum Committee	_____
Professional Education Council (if applicable)	_____
Graduate Council Curriculum Committee	_____
Graduate Council	_____
University Senate	_____

**Course revision proposals require a Course Inventory Form be submitted by the College Dean's office to the Office of the Registrar.*

**Revise a Program
(Action)**

Date:

College:

Department:

Contact Person: Name, email, phone

1. Identification of program:

1.1 Reference number: 059

1.2 Program title: Chemistry Masters of Science Thesis Concentration

2. Proposed change(s):

2.1 title:

2.2 admission criteria:

2.3 curriculum:

2.4 other:

3. Detailed program description:

Existing Program	Revised Program
All candidates are required to complete a minimum of 30 semester hours of graduate work. Students are required to complete 24 semester hours of coursework and 6 hours of thesis research. Students who have completed 3 subject courses with a "B" average may elect to take <u>CHEM 516</u> as part of the 24-credit coursework requirement.	All candidates are required to complete a minimum of 30 semester hours of graduate work. Students are required to complete 24 semester hours of coursework and 6 hours of thesis research. Students who have completed 3 subject courses with a "B" average may elect to take <u>CHEM 516</u> as part of the 24-credit coursework requirement.
Required Core	Required Core
Select 4 of the following 5 subject areas, at least two of the courses must be at the 500-level: 12	Select 4 of the following 5 subject areas, at least two of the courses must be at the 500-level: 12
<u>CHEM 435G</u> Instrumental Analysis	<u>CHEM 435G</u> Instrumental Analysis
or <u>CHEM 531</u> Advanced Analytical Chemistry	or <u>CHEM 531</u> Advanced Analytical Chemistry
<u>CHEM 446G</u> Biochemistry	<u>CHEM 446G</u> Biochemistry
or <u>CHEM 535</u> Analytical Biochemistry	or <u>CHEM 535</u> Analytical Biochemistry
or <u>CHEM 562</u> Advanced Biochemistry	or <u>CHEM 562</u> Advanced Biochemistry
<u>CHEM 420G</u> Inorganic Chemistry	<u>CHEM 420G</u> Inorganic Chemistry

or <u>CHEM 520</u>	Advanced Inorganic Chemistry		
<u>CHEM 440G</u>	Introduction to Synthetic Organic Methodology		
or <u>CHEM 541</u>	Advanced Organic Chemistry		
<u>CHEM 452G</u>	Physical Chemistry II		
or <u>CHEM 450G</u>	Physical Chemistry I		
or <u>CHEM 550</u>	Advanced Physical Chemistry		
Investigation Course ¹			
<u>CHEM 580</u>	Chemical Skills	3	
Required Seminar ²			
<u>CHEM 598</u>	Graduate Seminar	2	
Thesis ³			
<u>CHEM 599</u>	Thesis Research/Writing	6	
Electives			
Elective course work may be selected from among the core courses or other advisor approved chemistry courses.		7-9	
Total Hours		30-32	
¹ The student must review the current chemical literature on a selected topic approved by the course instructor, and prepare a written report.			
² Requirements are to be satisfied according to the current departmental policy.			
or <u>CHEM 520</u>	Advanced Inorganic Chemistry		
<u>CHEM 440G</u>	Introduction to Synthetic Organic Methodology		
or <u>CHEM 541</u>	Advanced Organic Chemistry		
<u>CHEM 452G</u>	Physical Chemistry II		
or <u>CHEM 450G</u>	Physical Chemistry I		
or <u>CHEM 550</u>	Advanced Physical Chemistry		
Investigation Courses ¹			
CHEM 580	Chemical Skills	3	2
CHEM 585	Research Proposal		
CHEM 516	Literature Review	1	2
Required Seminar ²¹			
<u>CHEM 598</u>	Graduate Seminar	2	
Thesis ³²			
<u>CHEM 599</u>	Thesis Research/Writing	6	
Electives			
Elective course work may be selected from among the core courses or other advisor approved chemistry courses.		7-9	
Two elective courses at the 500 or 400G level			6
Total Hours		30-32	
¹ The student must review the current chemical literature on a selected topic approved by the course instructor, and prepare a written report.			

<p>³ Requirements are to be satisfied by preparing a thesis on the project chosen by the student and approved by the members of the student's graduate committee. Theses are to be prepared in accordance with the specifications established by the Graduate School. A thesis grade will be given after the final thesis has been approved by the student's graduate committee and the department head.</p>	<p>²¹ Requirements are to be satisfied according to the current departmental policy.</p> <p>³² Requirements are to be satisfied by preparing a thesis on the project chosen by the student and approved by the members of the student's graduate committee. Theses are to be prepared in accordance with the specifications established by the Graduate School. A thesis grade will be given after the final thesis has been approved by the student's graduate committee and the department head.</p>
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4. **Rationale:** Students are confused about choosing elective courses. The range is currently 7-9 credit hours for elective courses. Nearly all of our graduate classes are 3 credit hours making the 7 credit hour nearly impossible to achieve. We propose requiring CHEM 516, which is a literature review writing course. CHEM 516 and CHEM 585 will now become two credit hour courses each. This addition, together with a 2 course elective requirement, would make it straightforward for the student to sign up for and fulfill the 30 hour degree requirement.

5. **Proposed term for implementation:** Fall 2017

6. **Dates of committee approvals:**

Chemistry Department	_____ 12/2/2016 _____
College Graduate Curriculum Committee	_____
Graduate Council Curriculum Committee	_____
Graduate Council	_____
University Senate	_____

Regular Thesis

Year 1

Fall		Spring		Summer	
Course	Credit	Course	Credit	Course	Credit
5XX/4XXG	3	5XX/4XXG	3		
5XX/4XXG	3	5XX/4XXG	3		
516	2	585	2		
599	1	599	1		
598	0.5	598	0.5		
	9.5		9.5		

Year 2

Fall		Spring		Summer	
Course	Credit	Course	Credit	Course	Credit
5XX/4XXG	3	599	1		
5XX/4XXG	3	598	0.5		
599	3				
598	0.5				
	9.5		1.5		

**Revise a Program
(Action)**

Date:
 College: Ogden
 Department: Chemistry
 Contact Person: Eric Conte, eric.conte@wku; 56019

1. Identification of program:

- 1.1 Reference number:
- 1.2 Program title: Research Intensive Thesis Concentration

2. Proposed change(s):

- 2.1 title:
- 2.2 admission criteria:
- 2.3 curriculum:
- 2.4 other:

3. Detailed program description:

Existing Program	Revised Program
Required Core	Required Core
Select one of the following: 3	Select one of the following: 3
<u>CHEM 520</u> Advanced Inorganic Chemistry	<u>CHEM 520</u> Advanced Inorganic Chemistry
<u>CHEM 531</u> Advanced Analytical Chemistry	<u>CHEM 531</u> Advanced Analytical Chemistry
<u>CHEM 535</u> Analytical Biochemistry	<u>CHEM 535</u> Analytical Biochemistry
<u>CHEM 541</u> Advanced Organic Chemistry	<u>CHEM 541</u> Advanced Organic Chemistry
<u>CHEM 550</u> Advanced Physical Chemistry	<u>CHEM 550</u> Advanced Physical Chemistry
<u>CHEM 562</u> Advanced Biochemistry	<u>CHEM 562</u> Advanced Biochemistry
Required Seminar	Required Seminar
<u>CHEM 598</u> Graduate Seminar ¹ 2	<u>CHEM 598</u> Graduate Seminar ¹ 2

Thesis			
<u>CHEM 599</u>	Thesis Research/Writing ²	6	
Electives			
Select 4 hours ³		4	
Research Proposal			
<u>CHEM 588</u>	Research Proposal ⁴	3	
Practicum Research Experience in Chemistry			
<u>CHEM 596</u>	Practicum Research Experience in Chemistry ⁵	6	
Scientific Writing in Chemistry			
<u>CHEM 595</u>	Scientific Writing in Chemistry ⁶	6	
Total Hours		30	
¹	Requirements are to be satisfied according to the current departmental policy.		
²	Requirements are to be satisfied by preparing a thesis on the project chosen by the student and approved by the members of the student's graduate committee. Theses are to be prepared in accordance with the specifications established by the Graduate School. A thesis grade will be given after the final thesis has been approved by the student's graduate committee and the Department head.		
Thesis			
<u>CHEM 599</u>	Thesis Research/Writing ²	6	
Electives			
Select one 500 level CHEM core course or one from the following: CHEM 535, CHEM 560, CHEM 590, CHEM 591 ³		3	
Literature Review			
<u>CHEM 516</u>	Literature Review	2	
Research Proposal			
<u>CHEM 588</u>	Independent Research Proposal ⁴³	2	
Practicum Research Experience in Chemistry			
<u>CHEM 596</u>	Practicum Research Experience in Chemistry ⁵⁴	6	
Scientific Writing in Chemistry			
<u>CHEM 595</u>	Scientific Writing in Chemistry ⁶⁵	6	
Total Hours		30	
¹	Requirements are to be satisfied according to the current departmental policy.		
²	Requirements are to be satisfied by preparing a thesis on the project chosen by the student and approved by the members of the student's graduate committee. Theses are to be prepared in accordance with the specifications established by the Graduate School. A thesis grade will be given after the final thesis has been approved by the student's graduate		

<p>Students in the Research Intensive Thesis concentration may opt to use their published papers as chapters in their thesis.</p> <p>³ Only one elective course work may be selected from the subject courses or other appropriate chemistry courses approved by the student's graduate committee.</p> <p>⁴ Required students to prepare a research proposal which must be presented to and approved by the student's research committee and one member of the Department Graduate Committee.</p> <p>⁵ Requirements are to be satisfied by conducting a research project under the direction of the student's research advisor. This course provides faculty-mentored research experiences and emphasizes skill based training for students. Bridging the gap between academic study and professional development, this course will help students to develop and enhance problem solving and communication skills. This course emphasizes mastery of advanced technical skills, independent of thesis research.</p> <p>⁶ Requires students to prepare and submit two manuscripts based on their research to peer-reviewed journals under the guidance of the student's research committee. At least one paper must be accepted to receive credit and graduate.</p>	<p>committee and the Department head. Students in the Research Intensive Thesis concentration may opt to use their published papers as chapters in their thesis.</p> <p>³ Only one elective course work may be selected from the subject courses or other appropriate chemistry courses approved by the student's graduate committee.</p> <p>⁴³ Requires students to prepare a research proposal which must be presented to and approved by the student's research committee and one member of the Department Graduate Committee.</p> <p>⁵⁴ Requirements are to be satisfied by conducting a research project under the direction of the student's research advisor. This course provides faculty-mentored research experiences and emphasizes skill based training for students. Bridging the gap between academic study and professional development, this course will help students to develop and enhance problem solving and communication skills. This course emphasizes mastery of advanced technical skills, independent of thesis research.</p> <p>⁶⁵ Requires students to prepare and submit two manuscripts based on their research to peer-reviewed journals under the guidance of the student's research committee. At least one paper must be accepted to receive credit and graduate.</p>
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4. **Rationale:** There is confusion with students signing up for electives with this program. 4 credit hours are currently required however there are no 4 credit hour graduate classes.

5. **Proposed term for implementation: Fall 2017**

6. **Dates of committee approvals:**

Chemistry Department

12/2/2016

College Graduate Curriculum Committee

Graduate Council Curriculum Committee

Graduate Council

University Senate

Research Intensive

Year 1

Fall		Spring		Summer	
Course	Credit	Course	Credit	Course	Credit
5XX	3	5XX	3		
516	2	588	2		
596	3	595	3		
599	1	599	1		
598	0.5	598	0.5		
	9.5		9.5		

Year 2

Fall		Spring		Summer	
Course	Credit	Course	Credit	Course	Credit
595	3	599	1		
599	3	598	0.5		
596	3				
598	0.5				
	9.5		1.5		

Create a New Course (Action)

Date:

College, Department: Ogden, Chemistry

Contact Person: Eric Conte; eric.conte@wku.edu; 56019

1. Proposed course:

- 1.1 Course prefix (subject area) and number: CHEM 585
- 1.2 Course title: Research Proposal
- 1.3 Abbreviated course title:
(maximum of 30 characters or spaces)
- 1.4 Credit hours: 2
- 1.5 Variable credit (yes or no): no
- 1.6 Repeatable (yes or no) for total of ___ hours:
- 1.7 Grade type: letter
- 1.8 Prerequisites: none
- 1.9 Corequisites: none
- 1.10 Course description:

Students will learn the research proposal writing process. Students will learn to identify problems/needs, review chemical literature, formulate hypotheses and design research methodology. Students will prepare a research proposal on his/her thesis research topic that is suitable for submission to a grant awarding agency.

- 1.11 Course equivalency:

2. Rationale:

- 2.1 Reason for developing the proposed course: We wish to replace CHEM 580 with this course in our MS thesis program. Topics in the course description for CHEM 580 such as glass blowing are not being covered because of the lack of usefulness nowadays. This course will cover a topic that is useful to all MS students. Students will become adept at:
Literature retrieval using Web of Science and SciFinder
Obtaining spectra from reliable web sources.
Citation managing software
The proposal writing process. This process includes stating the research problem needing to be solved, significance of proposed research, and plan of procedure. Also a budget and budget justification will be developed.

- 2.2 Relationship of the proposed course to other courses at WKU:

3. Discussion of proposed course:

- 3.1 Schedule type:
- 3.2 Learning Outcomes:
- 3.3 Content outline:
- 3.4 Student expectations and requirements:
- 3.5 Tentative texts and course materials:

4. Budget implications:

- 4.1 Proposed method of staffing:

4.2 Special equipment, materials, or library resources needed:

5. Term for implementation: Fall 2017

6. Dates of committee approvals:

Department	12/2/2016
College Curriculum Committee	_____
Professional Education Council (if applicable)	_____
Graduate Council Curriculum Committee	_____
Graduate Council	_____
University Senate	_____

***New course proposals require a Course Inventory Form be submitted by the College Dean's office to the Office of the Registrar.*

Create a New Course (Action)

Date: 09/26/2016

College, Department: Ogden College of Science and Engineering, Physics

Contact Person: Ali Oguz Er, ali.er@wku.edu, 5-6202

1. Proposed course:

- 1.1 Course prefix (subject area) and number: PHYS 565
- 1.2 Course title: OPTICAL DETECTION METHODS OF BIOLOGICAL AND CHEMICAL AGENTS
- 1.3 Abbreviated course title: OPTICAL DETECTION METHODS
(maximum of 30 characters or spaces)
- 1.4 Credit hours: 3
- 1.5 Variable credit (yes or no): no
- 1.6 Repeatable (yes or no) for total of ___ hours: no
- 1.7 Grade type: Standard Letter Grading
- 1.8 Prerequisites: PHYS 560 or consent of instructor
- 1.9 Corequisites: none
- 1.10 Course description: Explore the application of optical detection technologies to detect and characterize chemical and biological agents. Optical methods such as laser induced breakdown spectroscopy (LIBS), light detection and ranging (LIDAR), coherent anti-stokes Raman spectroscopy, photoacoustic, and photothermal imaging. Apply theoretical principles to real-world examples.
- 1.11 Course equivalency: none

2. Rationale:

- 2.1 Reason for developing the proposed course: Detecting and diagnosing high-priority biological and chemical threat agents is of the utmost importance to domestic security. Students will learn how to characterize and develop optical detection methods that can be used to analyze samples, so that appropriate measures for public safety and health can be taken. This course will enhance the Master of Homeland Security Science degree content
- 2.2 Relationship of the proposed course to other courses at WKU: There is an optics (PHYS 441) course in the physics curriculum. However, even taken for graduate credit (PHYS 441G), the content is largely basic knowledge about beam propagation, geometrical optics, and interference. In the proposed Optical Detection Methods course, students will focus more on the application of optical principles to detection of biological and chemical agents. In the proposed course students are expected to gain ancillary knowledge in biology, chemistry and solid state physics in order to develop the intuitive capability to discover and research potential applications of optics to these fields.

3. Discussion of proposed course:

- 3.1 Schedule type: weekly
- 3.2 Learning Outcomes: After completing these course, students will be able to:
 - Describe the physics underlying optical detection methods
 - Describe the interaction between light and materials
 - Calculate properties of various types of laser and the propagation of laser beams

- Evaluate the use and appropriateness of lasers for some common detection applications
- Define and explain various chemical and biological agents and rationally estimate appropriate technique(s) for their detection
- Apply principles of physics, chemistry and biology to threat detection in homeland security

3.3 Content outline:

FOUNDATION

- Introduction
- Optics and lasers
- Laser-Material Interaction (thermal & optical)
- Basics of laser spectroscopic technology and instrumentation

LASER SPECTROSCOPIC TECHNIQUES

- Laser Induced Breakdown Spectroscopy (LIBS), Light Detection And Ranging (LIDAR)
- Infrared Spectroscopy
- Raman Spectroscopy

OTHER DETECTION TECHNIQUES THAT USE LIGHT

- Photoacoustic sensing techniques
- Photothermal imaging
- Laser-induced fluorescence
- Modulated laser spectroscopy (for ultrasensitive trace vapor detection)

PROJECTS

REVIEW

3.4 Student expectations and requirements: There will be two midterm examinations and one final exam. Each student will also write a research paper on a subject chosen in consultation with the course instructor. In that paper the student will research an application of optical detection, write a report and make a presentation to the class at the end of the semester.

3.5 Tentative texts and course materials: In most cases, instructor lecture notes will form the core course content. However, for supplementary information, the following reference books will be suggested: Laser-Based Optical Detection of Explosives by P. Pellegrino, CRC Press; Optical Detection Theory for Laser Applications by G. Osche, Wiley; Detection of Chemical, Biological, Radiological and Nuclear Agents for the Prevention of Terrorism by J. Banoub, Springer.

4. Budget implications:

- 4.1 Proposed method of staffing: to be taught by an existing faculty
- 4.2 Special equipment, materials, or library resources needed: none

5. Term for implementation:

Fall 2017

6. Dates of committee approvals:

Department

09/28/2016

College Graduate Curriculum Committee

Professional Education Council (if applicable)

Graduate Council

University Senate

***New course proposals require a Course Inventory Form be submitted by the College Dean's office to the Office of the Registrar.*