Mississippi State University
Graduate Council
November 30, 1:30 pm

Call to Order: Dr. Rebecca Robichaux-Davis, Chair

Welcome and Introductions

Approval of minutes: October 26, 2018

Report from UCCC: Dr. Dana Franz

1. Modification of the Master of Science in Chemistry

Report from the Graduate School: Dr. Peter Ryan

1. Dual Bachelor-Master’s degree programs
2. Lapsed Graduate Student program

Report from the Graduate Student Association: John Buol

New Business

Adjourn
October 26, 2018

PRESENT: Amy Adkerson (Jenny Turner), Kevin Armstrong, Henk Arnoldus, Ashli Brown Johnson, Russell Carr, Timothy Chamblee, Frances Coleman (Bob Wolverton), Lara Dodds, Dana Franz, Don Grebner, Larry Hanson, Richard Harkess, W. Brien Henry, Julie Jordan, Laura Marler, Nicole Ponder, Susan Seal

ABSENT: Linkan Bian, Judy Bonner, John Buol, Priscilla Hill, Beth Miller, Rebecca Robichaux-Davis, Peter Ryan, David Shaw, Chien Yu

REGULARE ATTENDERS: Alexis Davis, Erica Waldman

GUEST: Dan Gadke

I. The October 26, 2018 meeting of the Graduate Council of Mississippi State University was called to order by Vice Chair Dr. Russell Carr at 1:35 PM in the Templeton Room of Mitchell Memorial Library.

II. Carr asked for approval of the minutes from the September 14, 2018 meeting. Don Grebner moved to approve and Richard Harkess seconded. The motion passed unanimously.

III. Report from University Committee on Courses and Curricula (UCCC): Dana Franz
   - Name change for Ph.D. in College/Postsecondary Student Counseling & Personnel – Dan Gadke
     Dana Franz asked to move forward the name change for Ph.D. in College/Postsecondary Student Counseling & Personnel for discussion and asked for a second; Larry Hanson second. Dana Franz stated no changes are being made within the program. The proposal is merely to change the program’s name in an effort to provide clarity to prospective students pertaining to the program of study.

     After a brief discussion, Dr. Carr asked for a motion to approve the name change; Don Grebner second. The motion carried unanimously.

IV. Report from the Graduate School: Brien Henry
    Dr. Henry announced the following:
    - Three Minute Thesis, the graduate student competition, is approaching. Awards will be given and the winner will be given the opportunity to compete against students from other graduate institutions at the upcoming 2019 Annual Meeting of the Conference of Southern Graduate Schools (CSGS). Departments were asked to encourage students to participate.

    - The Graduate Recruitment Assistance Grants (GRAGS) have been distributed to various departments across campus. Proposals are submitted in the fall and more departments are encouraged to submit proposals next year.

    - Dr. Henry updated the council on the progress of the Lapsed Graduate Student program and asked departments to bring forward any qualifying applicants.

    - The McNair Scholar’s Day was successful with 28 scholars in attendance. They were able to tour the campus, hear President Keenum speak and meet with academic advisors within their desired departments.
V. Report from the Graduate Student Association (GSA): John Buol
   - No Report

VI. Old Business:
   - Review of the Graduate Catalog Policies and Procedures: Brien Henry
     Dr. Henry updated the council on the subcommittee’s continual efforts in reviewing the Graduate Catalog. Reviewing of the academic policies section within the catalog has been completed.

   - Graduate School Website: Brien Henry
     The Graduate School website will be one of the first to make the transition to the new university template. The first steps have been completed which included meetings with ITS, completion of the questionnaire and outline, and engineering of the assistantship clearinghouse. The Graduate School is currently waiting for next steps after recently sending the website’s color selections to ITS.

VII. Carr announced the next Graduate Council meeting will be Friday, November 30th at 1:30 p.m., in Mitchell Memorial Library, Templeton Room. There being no further business, Carr moved to adjourn, seconded by Ponder. The meeting adjourned at 1:44 p.m.
NOTE: This form is a cover sheet that must accompany the degree program change proposal. The actual proposal should be prepared in accordance with format requirements provided in the Guide and Format for Curriculum Proposals published by the UCCC. Both cover sheet and proposal should be submitted to UCCC Mail Stop 9702 (281 Garner Hall), Phone: 325-9410.

College: Arts & Sciences  Department: Chemistry

Contact Person: Joe Emerson  Mail Stop: 9573  E-mail: jpe67@msstate.edu
Nature of Change: Adding a non-thesis option to MS program
Date Initiated: Fall 2018  Effective Date: Spring 2019

Current Degree Program Name: Master of Science

Major: Chemistry  Concentration: n/a

New Degree Program Name: Master of Science

Major: Chemistry  Concentration: Thesis
Major: Chemistry  Concentration: Non-Thesis

Summary of Proposed Changes:

The modification of the Master of Science in Chemistry degree program would afford students pursuing a MS in Chemistry the option of choosing a thesis or non-thesis based curriculum. The research concentration would reflect our current MS program. The new, non-thesis option would provide a course-work only concentration affording a MS degree with 30 hours of graded course content.
GRADUATE DEGREE MODIFICATION OUTLINE FORM

Use the chart below to make modifications to an existing Graduate Degree. All deleted courses and information should be shown in *italics* and all new courses and information in **bold**. Please include the course prefix, number, and title in both columns. Expand rows as needed.

<table>
<thead>
<tr>
<th>CURRENT Degree Description</th>
<th>PROPOSED Degree Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree: Master of Science (MS)</td>
<td>Degree: Master of Science (MS)</td>
</tr>
<tr>
<td>Major: Chemistry</td>
<td>Major: Chemistry</td>
</tr>
<tr>
<td>Concentrations: n/a</td>
<td>Concentrations: <strong>Thesis and Non-thesis</strong></td>
</tr>
</tbody>
</table>

The Department of Chemistry provides a flexible and dynamic environment in which to pursue a Master of Science or Doctor of Philosophy degree in chemistry. Students have the opportunity to work with faculty with interests in Biochemistry, Chemical Education, Environmental Chemistry, and Materials Science, as well as in Analytical, Inorganic, Organic, and Physical Chemistry. The faculty has active research programs in Synthesis (inorganic, organic, polymer and supramolecular synthesis), Surface Chemistry (catalysis and corrosion studies), Spectroscopy (IR laser spectroscopy and bioanalytical applications for Raman and Surface Enhanced Raman methods), Structural Biology (using NMR, calorimetry and computational methods), and Biophysical studies (including cancer drug discovery). Environmental research programs focus on the development of novel miniature chemical sensors and on pesticide and herbicide transport while computational chemists are developing *Ab initio* and semiempirical methods to study complex biological systems and important chemical processes.

The Department of Chemistry provides a flexible and dynamic environment in which to pursue a Master of Science or Doctor of Philosophy degree in chemistry. Students have the opportunity to work with faculty that have interests in the traditionally defined areas of Analytical, Biological, Inorganic, Organic, and Physical Chemistry. Additionally, active research in the interdisciplinary areas of Chemistry Education and Polymer and Materials Science are also available.

Students wishing to pursue a program leading to a Master of Science degree in Chemistry are required to complete a thesis or non-thesis concentration outlined below. The thesis concentration requires MS students to engage in research with a member of the graduate faculty. This unique experience gives students hands-on knowledge in research and develops practical skills associated with regular laboratory practices. The non-thesis concentration requires additional course work broadening MS student’s education experiences and technical knowledge. Both concentrations, however, will refine the MS student’s knowledge in chemistry and prepare them for challenges in academic settings and industrial careers.
Students may choose a thesis or non-thesis concentration.

The thesis concentration requires a minimum of 6 hours chemistry research (CH 8000) under the supervision of a graduate faculty member (research advisor) in the Department of Chemistry. Students choosing the thesis option, must generate and defend an original thesis as part of a final examination for the MS degree program. All thesis track MS students are required to complete at least 12 hours of CH 8000-level courses and 1 hour of chemistry seminar (CH 8711) as part of their MS degree.

The non-thesis option requires additional course work to generate a minimum of 30 hours of course work. Students choosing this course-work only concentration will pass a comprehensive chemistry examination directed by a graduate faculty member (academic advisor) in the Department of Chemistry as part of the MS degree program. All non-thesis track MS students are required to complete at least 15 hours of CH 8000-level courses and 1 hour of chemistry seminar (CH 8711) as part of their MS degree.

<table>
<thead>
<tr>
<th>CURRENT CURRICULUM OUTLINE</th>
<th>Required Hours</th>
<th>PROPOSED CURRICULUM OUTLINE</th>
<th>Required Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>CH 8000 Research</td>
<td>6 hr</td>
<td>CH 8000 Research</td>
<td>6 hr</td>
</tr>
<tr>
<td>CH 8711 Seminar</td>
<td>1 hr</td>
<td>CH 8711 Seminar</td>
<td>1 hr</td>
</tr>
<tr>
<td>6000 level or above courses chosen in consultation with the research director/committee.</td>
<td>23 hrs</td>
<td>6000-level or above courses chosen in consultation with the research advisor/committee.</td>
<td>11 hrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8000-level CH courses chosen in consultation with the research advisor/committee.</td>
<td>12 hrs</td>
</tr>
<tr>
<td>Total Hours</td>
<td>30 hrs</td>
<td>Total Hours</td>
<td>30 hrs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concentration 2. Non-thesis</td>
<td></td>
</tr>
<tr>
<td>CH 8711 Seminar</td>
<td></td>
<td>1 hr</td>
<td></td>
</tr>
<tr>
<td>6000-level or above courses chosen in consultation with the academic advisor/committee.</td>
<td>14 hrs</td>
<td>8000-level CH courses chosen in consultation with the academic advisor/committee.</td>
<td>15 hrs</td>
</tr>
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Justification and Student Benefit

This proposal aims to modernize our Master of Science (MS) program in Chemistry by offering two concentrations: A thesis track and a non-thesis track. The thesis track is a research intensive concentration and is for the most part our current MS program. The thesis-based concentration affords MS students an opportunity to take 24 hours of course-work then take an additional 6 hours of Thesis/Research (CH 8000) where these students will conduct research under the guidance of a graduate faculty member. The 6 hours of required CH 8000 give students an opportunity to gain meaningful hands-on experiences while uncovering new information in a research setting. The open-ended nature of chemistry research also allows for these thesis-based MS students to improve their deductive reasoning skills, appreciation of the scientific literature, and ability to design quality experiments. Additionally, the thesis-based concentration affords an opportunity for students to specialize in a specific area of chemistry. However due to the unpredictability of research, thesis-based MS degrees can often vary dramatically in length, where the typical span of a thesis-based MS program ranges from 1 to 4 years of study. Thesis-based MS students will write and defend a thesis as a requirement of this MS program.

Alternatively, the new, non-thesis track is a course-work only concentration, which affords a new option for graduate students to progress towards a graduate degree in chemistry at MSU. The non-thesis MS students will take 30 hours of course-work as part of this program. This includes additional graduate credit hours at both 6000- and 8000-level courses, which will broaden these MS student’s understanding of chemical principles in a structured, classroom setting. Non-thesis based MS degrees can be granted to students on a regular and predictable timeframe, which is a major advantage to some students seeking a graduate degree. The non-thesis track offers similar rigor to the thesis-based program, where these MS students have to take 125% the GPA-generating course load compared to thesis MS students. The non-thesis MS students will also have to pass a comprehensive (oral and written) chemistry exam before graduation. At this time, we aim to use the American Chemical Society Standardized Exams from three of the five traditional areas of chemistry as an assessment tool for written portion of this comprehensive exam. Students would have 5 opportunities to pass 3 exams at or above the 75 percentile based on national normalized statistics. In many ways, this comprehensive chemistry exam is more challenging than defending a thesis, due to the breadth and depth of chemistry that is assessed on these exams. I would encourage students to prepare for months before they attempt portions of the comprehensive exam. The oral portion of the comprehensive exam will be more fluid and cover topics throughout chemistry, where students will be responsible understanding topics from simple molecular orbital theory discussed in general chemistry to modern topics in quantum mechanics. The 3 faculty members serving on a particular MS committee will dramatically flavor the topics of this oral exam, where their expertise will likely line up with their line of questions. The expectation for the oral exam is that the MS student should demonstrate “good” knowledge in chemistry. Failure of this oral portion of the comprehensive exam would result in the student having to reschedule this event in 4 months, similar to failing other defenses associated with our MS and PhD programs.

All admitted MS students in the Department of Chemistry have some experience working in a laboratory setting, and I would estimate 95% or more of them have done academic research as part of their BS degree program, which gives students a very good idea on what to expect when they are admitted as an MS student. Both thesis and non-thesis options can be effectively used as “spring boards” into other academic programs (medical school, graduate school, etc.) or other forms of employment. There are many local companies that would benefit from employees having advanced chemistry coursework and broad chemical knowledge, which they can gain through our non-thesis MS program without having to spend significant time in an on-campus research lab.

Additionally, over the 10 years since this description of the MS degree program was written, the Department of Chemistry has undergone major changes in personnel. We also expect this trend to
continue due to multiple faculty members in Chemistry approaching retirement age. These personnel changes dramatically impact the specific research areas described within the original MS description. For example in 2 months, there will be no “cancer drug development” research on-going within the Department. Therefore we are using this program modification application to also simplify the description of the MS degree program, which better encompasses the current and future research efforts in the Department. In addition, as Chemistry has become an increasingly far-reaching field, there are more options than ever for MS chemists, and the justification for requiring all MS chemists to do on-campus, academic research is becoming increasingly tenuous. For example, someone working at Chemours would benefit from advanced inorganic chemistry coursework, chemical safety, etc., but they would not need to perform research in a laboratory in the Department of Chemistry to make a positive impact at their organization.

It also should be noted that within the College of Arts & Sciences at Mississippi State University, several other STEM based departments including the Departments of Physics and Math currently offer thesis and non-thesis based MS programs, and there are several programs that offer similar split MS programs in the College of Engineering.

1. This modification affords students additional opportunities to progress towards an advanced degree in chemistry. New and developing STEM jobs in the Southeastern portion of the US require a technically trained workforce, and this degree modification allows for increased flexibility to students training for these positions.

2. Changes to the MS degree program in the Department of Chemistry will not result in duplication.

3. There are a number of rising career options for chemists that require an advanced degree, but do not require an advanced and prolonged research experience. By offering a course-work only concentration, we believe we will serve this growing job area and will significantly grow our MS degree production by affording non-traditional students, working-students, and/or professionals to progress through the MS program without the uncertain progress of academic research.

4. Advanced degrees in chemistry provide a competitive advantage over traditional BS in chemistry degree holders. The advanced training students gain from the MS programs (thesis and non-thesis options) will give them a competitive advantage over applicants will less training. The non-thesis option also provides a mechanism for individuals working in STEM fields to advance their education and career options in Mississippi and our region of the country.

5. Advanced degree options provide a route to higher starting salaries and work-place promotions. Clearly adding flexibility to the MS program will add a range of student options to further their career goals and career options, which typically result in higher pay and quality of life. The addition of a non-thesis MS option also opens up an opportunity in the future to incorporate distance-learning components into the MS program; allowing more opportunities for off-campus student enrollment, which is not usually feasible for our thesis MS students.

Effective Date

The Department of Chemistry aims to have this modification in place for Spring 2019.
September 7, 2018

Please consider this letter to support the graduate degree modification proposed by the Department of Chemistry, which creates two tracks associated with our Masters in Science (MS) degree program. The two tracks (thesis and non-thesis) will provide students more flexibility in their MS program, where they can focus their efforts in research (thesis track) or the classroom (non-thesis track). The thesis track is simply our currently approved MS degree program, where the non-thesis track is the same program except for the 6-hrs of required CH 8000 Thesis/Research is replaced with 6-hrs of graded course work.

Adding the non-thesis track affords students a new opportunity to make progress towards a MS degree in Chemistry, without the risk of uncertain progress in academic research in chemistry. We believe this option will be highly attractive to non-traditional, working students and professions interested in furthering their academic training.

The MS degree modification proposal has been discussed and generally approved by the Department of Chemistry during our Fall 2018 Departmental Retreat. However, the Graduate Affairs Committee serves as the graduate curriculum approving entity within the Department of Chemistry. Below all members of the Graduate Affairs Committee have endorsed this letter in support of this proposal.

Best,

Joseph P. Emerson, Ph.D.
Associate Professor/Graduate Coordinator

Nicholas C. Fitzkee, Ph.D.
Associate Professor

Deb A. Misna, Ph.D.
Assistant Professor

Colleen N. Scott, Ph.D.
Assistant Professor

C. Edwin Webster, Ph.D.
Professor

David O. Wipf, Ph.D.
Professor