2008-2009 Yearly Assessment Report
for the Department of Chemistry Graduate Program

Program Mission:

The mission of the M.S. degree program is:

1. to maintain a commitment to excellence in teaching and research in the advanced study of chemistry;
2. to provide Marshall University's M.S. in Chemistry graduates with opportunities to acquire appropriate preparation for future success in careers in chemistry and allied fields that require competence in the chemical sciences, or for continuing study in programs leading to professional degrees or the Ph.D.;
3. to provide candidates with competence and skills in researching, processing, evaluating, and defending new knowledge in chemistry.

This program mission conforms to the Marshall University's broad mission and to the mission of the Graduate College.

Program Goal:

The goal of the program is to provide Marshall M.S. in Chemistry graduates with a degree that prepares them for career advancement in industries and/or for further professional or graduate work.

Five Comprehensive and Measurable Program Objectives in Support of Marshall University's Educational Goals Spanning Multiple Learning Domains:

1. Graduates should be able to synthesize and integrate chemical knowledge.
2. Graduates should be able to demonstrate critical thinking skills.
3. Graduates should be resourceful in locating relevant chemical information using library or online services.
4. Graduates should be able to communicate chemical principles and information, in both oral and written formats, effectively.
5. Graduates should be able to demonstrate the basic skills necessary for placement in appropriate positions.

Assessment Measures:

Objective 1: synthesize and integrate chemical knowledge

a. M.S. in Chemistry candidates are required to complete a distribution of courses that reflect competence in 3 of the 5 subdisciplines of chemistry as well as in their selected areas of concentration. Highly experienced and trained chemistry faculty execute the assessment in these courses using problem sets, exams, and final exams. Students must maintain a GPA of 3.00 or better to remain in the program. Materials for each course are reviewed for level of difficulty, content breadth and depth, problem solving, and quantitative reasoning periodically

for the subdisciplines (Inorganic Chemistry, Organic Chemistry, Analytical Chemistry, Biochemistry, and Physical Chemistry) by committees primarily composed of faculty from the subdiscipline being evaluated.

b. Each student is required to present a literature seminar reviewing an aspect of current and ongoing research in chemistry that is not directly related to the student's thesis research topic. This seminar is presented to the entire department. Attending faculty rate the presentation using the *Chemistry Graduate Student Seminar Rubric* developed previously.

Objective 2: critical thinking skills

M.S. candidates are required to present two seminars before the entire department: a literature seminar (described under Objective 1) and a presentation of the candidate's M.S. thesis research. Faculty rate each seminar on the basis of the critical thinking skills exhibited by the candidate using the rubric mentioned previously. In addition, the student must defend the thesis before a faculty committee, consisting of the thesis research advisor and two other faculty members (generally from the Department of Chemistry except in unusual circumstances), and this committee will likewise rate the critical thinking ability demonstrated during this defense.

Objective 3: literature search

a. Students are required to complete CHM 505, Chemical Information Retrieval. The instructor of this course will rate each student.

b. The literature seminar requirement, which carries 1.00 hour course credit, will ensure that students undertake the task of extensive literature search prior to writing a thesis. The Department of Chemistry faculty attending student presentations will evaluate seminar abstracts for inclusion of pertinent references and information using the *Chemistry Graduate Student Seminar Rubric.*

Objective 4: written and oral communication

a. Oral communication is assessed during the seminar presentations and the thesis defense utilizing the *Graduate Student Seminar Rubric*.

b. Oral communication is further assessed by an annual evaluation of Graduate Teaching Assistants.

c. The thesis defense committee will assess the written communication component.

Objective 5: student placement

Exit interviews and surveys plus follow-up alumni surveys.

M.S. Degrees Awarded: none

New Course Approved: CHM 678 Microscopy in Research

Plans for the Current Year:

The Department of Chemistry has developed and is in the process of implementing a strategic plan. One of five major areas of focus in this plan is the MS program. A strategic goal is to implement a new MS curriculum plan by fall 2011. Thus, during the current year, the Graduate Affairs Committee of the Department of Chemistry will develop this plan and submit it for approval.

Two new course proposals are under consideration: CHM 660 Chemical Computation in Research; CHM 685-688 Independent Study. These requests have been approved by the Department and are in the process of obtaining the necessary endorsements before consideration by the Graduate Council.

Assistance Needed:

An important concern is the continuing absence of adequate stipends for a critical mass of graduate students seeking the M.S. in Chemistry. The annual budget to provide stipends for graduate students in the Department of Chemistry is currently $14.6 K. This is only marginally greater than the average stipend for **one full-time graduate student** provided by peer institutions, an amount which is not competitive with stipends provided by Ph.D.-granting institutions. (In other words, an M.S. degree may be earned at a Ph.D.-granting institution while receiving a comfortable stipend, often as high as $25K.) If the goal of Marshall University is to increase the level of emphasis on faculty research productivity, it is appropriate to ask how this is to be accomplished without admitting and supporting at least one full-time graduate student per year for each research-active faculty member. The goal should be to advertise an adequate number of Graduate Assistant positions with competitive stipend rates each year in order to recruit students with reasonable qualifications. Over time, it should likewise be the goal of faculty to obtain grants providing support for Graduate Assistants beyond the first year; however, it is unrealistic to expect that the University could ever be relieved of support for these positions for at least the first year of each student's studies.

A strategic goal to be implemented is obtaining at least five new MS stipends and tuition waivers by 2014. This will help to obtain our vision: to be known as one of the top undergraduate and MS programs in the nation by integrating teaching with research experience.