

**2006-2007 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: 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 4: student placement

Exit interviews and surveys plus follow-up alumni surveys.

M.S. Degrees Awarded:

Thabo Gcwabaza, December 2006, "Scanning Probe Microscopy of Silicon at Breakdown Voltages"

Plans for the Current Year:

The Graduate Affairs Committee of the Department of Chemistry is considering development of new assessment devices focusing on the four objectives outlined above for the thesis defense and for exit interviews. Guidelines for graduate student presentations and thesis format are being reviewed. If possible, surveys will be sent to recent alumni in order to assess their level of satisfaction with the program and solicit suggestions for improvement.

Assistance Needed:

Assessment of this program is largely irrelevant in the 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.