

**University of Central Florida Ph.D. in Chemistry Proposal
Division of Colleges and Universities Staff Analysis**

Recommended Action: Approve Implementation

Proposed Implementation Date: Fall 2003

Estimated Costs:

	Total	% & \$ Current	% & \$ New	% & \$ C&G	Cost per FTE
Year 1	\$220,019	72% \$159,025	28% \$60,994	0	\$33,539
Year 5	\$591,985	46% \$269,764	26% \$153,221	28% \$169,000	\$16,484

Projected FTE and headcount are:

	Projected Headcount	Student FTE
First Year	10	6.56
Second Year	22	13.99
Third Year	33	18.23
Fourth Year	42	21.48
Fifth Year	55	25.66

Criteria/Success Indicators			
Total Met With Strength	Total Met	Total Partially Met	Total Unmet
6	16	0	0

Abstract

The Ph.D. in Chemistry is listed in the 1998-2003 Strategic Plan and is aligned with the mission and strengths of the University. This degree, with tracks in materials chemistry, environmental chemistry and forensic science, will provide highly skilled chemists necessary to cultivate the growth of a number of key high-tech industries. The UCF program has been in the planning stages since 1995 and represents a collaborative effort by university professors in several different areas of the physical sciences. Dr. Charles E. Hoyle, Professor of Polymer Science and Chemistry at the University of Southern Mississippi, was retained as a consultant to review the proposal. He found that the proposed program was “rather unique among chemistry degree granting programs in the United States and has the potential of setting the department apart from other traditional chemistry departments”.

The University has conducted extensive research and has provided compelling evidence as to the need for an advanced degree program in Chemistry. In addition, the University has received the support and endorsement of many industries, both local and nationwide for this program. The Ph.D. program will contribute to the development of the highly skilled workforce required to foster high-tech development in the area and bolster the economy. The headcount is realistic and reflects the headcounts of similar programs within the SUS. The proposal outlines strategies the University has already undertaken to insure diversity in its student population.

The proposed curriculum calls for 72 semester credit hours required beyond the Bachelor's degree or 45 semester credit hours beyond the Master's degree. Each track requires 12 credit hours of core courses, a minimum 9 hours of elective courses, a 3 hour seminar, 6 hours of directed research in an area of concentration and a minimum of 15 dissertation hours. The remainder of the credit hours are to be satisfied by elective, directed research, and dissertation research in an area of concentration. The proposed program will complement and strengthen existing graduate programs in optics, materials science and engineering. It will also foster collaboration with existing institutes and centers, three of which have been started by the department within the last 5 years and promises to strengthen interdisciplinary projects in hydrogen storage and photovoltaics. Efforts in the development of biologically active agents and imaging techniques are expected to be enhanced by the increase in research opportunities provided by this degree. This program will make use of strong partnerships with the Physics Department and College of Engineering and Computer Science.

The proposal provides evidence that the number of experienced faculty assigned to the program is more than sufficient to implement the program. Library holdings appear to be sufficient with additional monographs to be purchased in year 1. The Chemistry Department has adequate space within its existing facilities to initiate the program.

The Chemistry Department has exhibited evidence that its faculty has been productive in both scholarly activities and securing extramural funding. Research funding has increased each year and the student headcount has remained stable with student increases in the forensic science area.

Dr. Hoyle has recommended that the program be approved and implemented.

1. The proposed program is listed in the current State University System Master Plan, and the goals of the proposed program relate to the institutional mission statement as contained in the Master Plan.

Met with Strength. The program is listed in the 1998-2003 Strategic Plan and is aligned with the mission and strengths of the University. The College of Arts and Sciences is the core of learning and research at the University. This degree program will contribute significantly to the mission of the College of Arts and Sciences through research efforts in Materials Science, Nano-science, Optics and Forensic Science enhancing overall research funding at UCF.

2. The proposed program does not duplicate other SUS offerings or, otherwise, provides an adequate rationale for doing so.

Met. While seven other Ph.D. programs in Chemistry are offered in the state, those programs do not offer the concentrations proposed for this program. Five are in the State University system; University of Florida, Florida State University, University of South Florida, Florida International University and Florida Atlantic University. Two are at private institutions; University of Miami and Florida Institute of Technology. Six of the seven are broad-based programs and the seventh, Florida Atlantic University, provides a focus in Bio-organic Chemistry and Bio-chemical Technology. Florida also has a dearth of graduates with doctorates in Chemistry. This program will provide highly skilled chemists necessary to cultivate the growth of a number of key high-tech industries.

Dr. Hoyle has indicated that “the proposal for three separate tracks is rather unique among chemistry degree granting programs in the United States and has the potential of setting the Department apart from other traditional Chemistry Departments”.

3. There is evidence that planning for the proposed program has been a collaborative process involving academic units and offices of planning and budgeting at the institutional level, as well as external consultants, representatives of the community, etc.

Met. This degree program has been in the planning stages since 1995 and represents a collaborative effort by university professors in several different areas of the physical sciences.

4. The proposal provides a reasonable timetable of events leading to the implementation of the proposed program.

Met. Implementation of the program is proposed for Fall 2003. While approval must be obtained by the Board of Governors and the next meeting is in mid-July, all elements are in place and the tight schedule will not adversely affect successful implementation should the degree be approved.

5. The proposal provides evidence that there is a need for more people to be educated in this program at this level.

Met with Strength. The University has conducted extensive research and has provided compelling evidence as to the need for an advanced degree program in Chemistry. In addition, the University has received the support and endorsement of many industries, both local and nationwide for this program. Letters of support were received expressing keen interest in collaborating with faculty, students and post-doctoral researchers in research efforts and the Ph.D. program will contribute to the development of the highly skilled work force required to foster high tech development in such areas as the semi-conductor industry, defense monitoring and the optics industry. Companies that provide environmental contaminant monitoring or remediation rely on environmental chemists. The National Center for Forensic Science and law enforcement agencies employ chemists with forensic science experience. Graduates of this program will provide the necessary expertise to contribute to Florida’s industries. This is evidenced by the number of companies that currently support research in the Chemistry Department.

Dr. Hoyle stated that “There is an exploding interest in the rapidly advancing forensics field in the United States that unfortunately has not been addressed by virtually any mainstream chemistry department.” He also indicated that the needs in the environmental chemistry area “continue to increase as the population expands and governmental and societal demands increase”.

6. The proposal contains reasonable estimates of headcount and FTE students who will major in the proposed program. The proposal also provides a signed EEO statement that indicates steps to be taken to achieve a diverse student body.

Met. The headcount is realistic and reflects the headcounts of similar programs within the SUS. While the cost per FTE for year one appears to be a little higher than would be expected, it is within the cost parameters of similar programs implemented at FIU and FAU. The proposal outlines strategies the University has already undertaken to insure diversity in its student population. It should be noted that the MS in Industrial Chemistry represents an extremely diverse student population with 55% female and 60% international students.

The consultant feels “that there is a significant potential for a much larger student body due to the potential for jobs in the three areas selected for emphasis”.

7. The proposal provides an appropriate, sequenced, and described course of study.

Met. The proposed curriculum calls for 72 semester credit hours required beyond the Bachelor’s degree or 45 semester credit hours beyond the Master’s degree. Each track requires 12 credit hours of core courses, a minimum 9 hours of elective courses, a 3 hour seminar, 6 hours of directed research in an area of concentration and a minimum of 15 dissertation hours. The remainder of the credit hours are to be satisfied by elective, directed research, and dissertation research in an area of concentration.

Dr. Hoyle reviewed the proposed curriculum and has indicated that it is sufficient for the degree program.

8. The proposed program relates to specific institutional strengths such as programs of emphasis, other academic programs and/or institutes and centers.

Met with Strength. The proposed program will complement and strengthen existing graduate programs in Optics, Materials Science and Engineering. It will also foster collaboration with existing Institutes and Centers, three of which have been started by the department within the last 5 years. It promises to strengthen interdisciplinary projects in hydrogen storage and photovoltaics. Efforts in the development of biologically active agents and imaging techniques are expected to be enhanced by the increase in research opportunities provided by this degree. This program will make use of strong partnerships with the Physics Department and College of Engineering and Computer Science.

9. If there have been program reviews or accreditation activities in the discipline pertinent to the proposed program, or in related disciplines, the proposal provides evidence that progress has been made in implementing the recommendations from those reviews.

Met. The American Chemical Society accredits only undergraduate Chemistry Programs. The last review of the UCF undergraduate program was conducted in 1999 and accreditation of the program was continued. The last program review in this discipline was conducted in 1992 and progress has been made in implementing recommendations although issues in several areas are continuing to be addressed.

10. The proposal provides evidence that the institution has analyzed the feasibility of providing all or a portion of the proposed program through distance learning technologies via its own technological capabilities as well as through collaboration with other universities.

Met. In that chemistry is a lab-based science, all courses will be taught on the main campus with the exception of some of the Forensic Science courses, which will be Web-based. No details of how those courses will be implemented was provided. The university indicates that no other university within the state of Florida possesses the combination of expertise and resources that could afford collaboration across the areas of Materials Chemistry, Environmental Chemistry and Forensic Science.

11. The proposal provides evidence that there is a critical mass of faculty available to initiate the program based on estimated enrollments.

Met with Strength. The proposal provides evidence that the number of faculty assigned to the program is more than sufficient to implement the program. Of the current 14 faculty members who will participate in this program, all have Ph.D.'s and 6 have supervised doctoral dissertations.

Dr. Hoyle feels that once the Forensic track is implemented, the need for a new faculty member will become obvious. He also feels that the campus interface in the physics and engineering areas will enhance the efforts in the optical materials/polymers areas at UCF.

12. For doctoral programs, the proposal provides evidence that the faculty in aggregate have the necessary experience and research activity to sustain the program.

Met with Strength. Evidence has been provided that the faculty have the necessary experience and research activity to sustain the program. A chart and faculty profiles have been provided that detail significant experience, publications and research activity. The faculty of the Chemistry Department has secured an estimated \$3 million in external research funding for the 2002-2003 academic year.

13. The proposal provides evidence that, if appropriate, there is a commitment to hire additional faculty in later years, based on estimated enrollments.

Met. The proposal states that 2 additional faculty will be hired in year 1 of the program to add expertise; one in the area of inorganic materials and nano-science and one in environmental chemistry.

14. The proposal provides evidence that library volumes and serials are sufficient to initiate the program.

Met. Library holdings appear to be sufficient for program implementation. Additional funds have been budgeted to strengthen holdings in the first year to compare favorably with the average number of holdings at 3 benchmark universities. The universities whose holdings were reviewed are Wayne State University, the University of North Texas and the University of California, Riverside.

Dr. Hoyle considers the current library base along with the use of search/retrieval services in Chemistry to be "adequate to support a strong Doctoral program".

15. The proposal provides evidence that classroom, teaching laboratory, research laboratory, office, and any other type of space which is necessary for the proposed program is sufficient to initiate the program.

Met. The Chemistry Department has adequate space within its existing facilities to initiate the program. A chart detailing the space available for this program has been provided. A new science building is planned to be completed by 2007 which will allow for expansion of the department.

16. The proposal provides evidence that necessary and sufficient equipment to initiate the program is available.

Met. Weaknesses were identified with respect to poorly maintained equipment during the last program review. New equipment was purchased to address this concern. A listing of available equipment was provided.

Dr. Hoyle indicated that there was no mention of funding for “technical support staff to help repair/design equipment and provide electronics technical assistance for use in Doctoral research projects”. He assumes that the University probably has some type of mechanical/electronics shop available to assist.

17. The proposal provides evidence that, if appropriate, fellowships, scholarships, and graduate assistantships are sufficient to initiate the program.

Met. The Chemistry Department currently has 7 GTA's with 6 new GTA's and 13 GRA's to be added by the 5th year of the program. Funding for the GRA's will be provided through external research grants. The additional GTA's have been committed to the Chemistry Department to accommodate the growth of the department.

18. The proposal provides evidence that, if appropriate, clinical and internship sites have been arranged.

Met. The Ph.D. in Chemistry is a discipline where clinical training and internships are not applicable.

19. The proposal provides evidence that, in the event that resources within the institution are redirected to support the new program, such a redirection will not have a negative impact on undergraduate education.

Met. The Chemistry Department will provide 7 existing GTA lines to the Ph.D. program.. This program is expected to attract high quality GTA's and faculty, and in fact, will benefit other programs through quality instruction and research opportunities.

20. The proposal provides a complete and reasonable budget for the program which reflects the text of the proposal. Costs for the program reflect costs associated with similar programs at other SUS institutions.

Met. The budget submitted is complete and comparable to similar programs implemented at other universities.

21. The proposal contains evidence that, if appropriate, the institution anticipates seeking accreditation for the proposed program.

Met. Accreditation is not available for chemistry at the doctoral level.

22. The proposal provides evidence that the academic unit(s) associated with this new degree have been productive in teaching, research, and service.

Met with Strength. The Chemistry Department has exhibited evidence that its faculty has been productive in both scholarly activities and securing extramural funding. Research funding has

increased each year and the student headcount has remained stable with student increases in the forensic science area.