February 26, 2020

TO: Members of the Board of Trustees

FROM: John A. Elliott, Ph.D.
Provost and Executive Vice President for Academic Affairs

RE: Graduate Certificate in Advanced Materials Characterization

RECOMMENDATION:

That the Board of Trustees approve a new Graduate Certificate in Advanced Materials Characterization.

BACKGROUND:

The justification for the Certificate Program in Advanced Materials involves the integration of all four courses and the knowledge that can be gained and used in the characterization of materials systems with multiple techniques. Real problems almost always require multiple methods of analysis. The outcome of the Certificate Program will be graduates that have the ability to decide what methods are needed to characterize a material, how to analyze data, and from laboratory methods understand basics of sample preparation, loading samples in different instruments, and basic operations. Those students completing the full certificate program will be able to use these credits in pursuing a Master of Engineering degree.

The certificate program has been developed as a collaboration between the Institute of Materials Science, the Department of Chemistry, and Materials Science and Engineering. It is anticipated that 20 students will enroll and graduate from the certificate program each year.
Request for New UConn Academic Degree Program

General Information
Name of degree program: Graduate Certificate in Advanced Materials Characterization
Name of sponsoring Department: Institute of Materials Science / Chemistry / Materials Science and Engineering
Name of sponsoring College: School of Engineering / College of Liberal Arts and Sciences
Campuses: Program Entirely Online
Contact persons: Steven Suib
Type of Proposal: New
Type of Program: Graduate Certificate
Anticipated Initiation Date: Fall 2020
Anticipated Date of First Graduation: Spring 2021
Entrepreneurial program, approved by Provost’s Office: Yes
Tuition for the program approved by Provost’s Office: Fee-based
CIP Code: 40.1099 (Materials Science, Other)

Justification for the New Program
The justification for the Certificate Program in Advanced Materials involves the integration of all four courses and the knowledge that can be gained and used in the characterization of materials systems with multiple techniques. Real problems almost always require multiple methods of analysis. The outcome of the Certificate Program will be graduates that have the ability to decide what methods are needed to characterize a material, how to analyze data, and from laboratory methods understand basics of sample preparation, loading samples in different instruments, and basic operations. Those students completing the full certificate program will be able to use these credits in pursuing a Master of Engineering degree.

Are there similar programs in CT or elsewhere?
No.

What are the desired learning outcomes of the program?
A person trained in the Graduate Certificate in Advanced Materials Characterization will understand how various methods of analysis for materials complement each other. No one method often solves a problem. What are the best methods to use, which methods are destructive, which are not, how are data analyzed, how are samples prepared – these and related questions will be addressed.
Graduate Certificate in Advanced Materials Characterization

Program Description
The targeted audience would be scientists and engineers either in industry or in academia. The structure of the program would involve both lab experiments and lectures. Ideally, students would have at least an undergraduate degree in science or engineering. Prospective students would be from many different backgrounds. Instructors would be Ph.D. scientists, engineers, and qualified UCONN staff members from IMS, SoE, CLAS, as well as some industrial participants.

Proposed Graduate Catalogue Copy
The Institute of Materials Science (IMS) offers a 12-credit certificate program to train engineers in the characterization of advanced materials that are crucial to creativity, innovation and product analysis and quality control in the globally competitive economy. The certificate program builds competency in the analysis of advanced materials systems related to understanding compositions and physical properties of materials, data analysis, sample preparation methods, and basic operation of spectroscopy, chromatography, and microscopy equipment. The program aims to teach scientists and engineers analysis, decision-making, optimization, verification and validation of materials systems.

Required Courses: IMS 5301, Microscopy; IMS 5302, Structural Analysis; IMS 5303 Compositional Analyses; IMS 5304, Surface and Interfacial Analysis.

The certificate is offered by IMS, the College of Liberal arts and Sciences, and the School of Engineering.

Faculty Involvement
Chemistry - Drs. Steven Suib, Jie He, Jim Rusling, Edward Neth.  
IMS - Roger Ristau, Capri Price, Nicholas Eddy, Daniela Morales  
Materials Science and Engineering - Drs. Mark Aindow, Pamir Alpay, Rainer Hebert  
United Technologies - Drs. Iuliana Cernatescu, Elizabeth Miller - both from Pratt and Whitney.

The current plan is to have the following individuals teach the four courses:
- IMS 5301 - Microscopy - Roger Ristau, Mark Aindow
- IMS 5302 - Structural Analysis - Edward Neth, Iuliana Cernatescu
- IMS 5303 - Compositional Analyses - Capri Price
- IMS 5304 - Surface and Interfacial Analysis, Steven L. Suib; Beth Miller

Enrollment and graduate projections
We estimate that 20 students will enroll and graduate from this program each year.
Program Evaluation
There will be student evaluations as well as evaluations by an Oversight Committee of the Certificate Program. The Oversight Committee will have one member from IMS, one from CLAS, and one from SoE. Metrics for success will involve numbers of continuing enrolled students and potential growth of the program.

Program Administration
The program will be administered through the Materials Science Program in the Institute of Materials Science (IMS). Advising will be done by the administrative assistant in IMS who advises graduate students, currently Osker Dahabsu. Oversight of the program will be by the Dean of the Graduate School and the Provost. Note that this Certificate Program is part of an MOU with Pratt and Whitney (PW) and UCONN signed by the OVPR and Provost. While PW is specifically named here, we expect enrollment from several other major companies as well as graduate students at UCONN. Programmatic changes would be decided by the Director and Associate Director of IMS in conjunction with input from all avenues (Deans, Provost, OVPR, Heads, etc.).

Funding and Financial Resources Needed
At this stage we do not anticipate a need for additional funding. All costs, the overall structure of the program, time requirements of staff, use of instrumentation, and supplies for lab experiments in time will be provided by IMS through the fee base course structure.

Other Resource Needs
Generally there will be use of instrumentation in IMS and for instrumentation in IPB that is run by IMS.

Consultation with other potentially affected units
There has been consultation with OVPR, SoE, CLAS, the Graduate School, and the Office of the Provost.

Who can apply to this program?
Internal applicants (current UConn students enrolled in another UConn degree or certificate program)
External applicants (individuals who are not currently UConn students)

Anticipated term and year of first enrollment
Fall 2020

Admission Requirements
Requirements include a background in science or engineering, preferably a bachelor’s degree.
Required for application:
- Personal statement
- 1 letter of recommendation

Term(s) to which students will be admitted
- Fall
- Spring

Application deadline: Rolling

Initiator
Steven L. Suib, Director of IMS, steven.suib@uconn.edu, 860-486-4623

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