New Co-Terminal Degree

Office of Academic Affairs
Graduate College
Illinois Institute of Technology
10 W. 35th St., Suite 7D7-1
Chicago, IL 60616
gradcoll@iit.edu

G802

MMAE	Dec. 5, 2016	MMAE	Dec. 5, 2016
Academic Unit 1 (Undergraduate)	Date	Academic Unit 2 (Graduate)	Date
Material Science and Engineering		Material Science and Engineering	
Program Name 1		Program Name 2	
S. Acharya /S·NAIR		S. Acharya	
Academic Unit Head/Program Director 1		Academic Unit Head/Program Director 2	

BS (MSE) + ME (MSE)

Select a CIP Code

The CIP code takes the following structure: **xx.xxxx** Where each x is a number between 0 and 9

This 6-digit code identifies, to the greatest specificity possible, an entire instructional program.The classification scheme seeks to comprehensively address all areas of study. Because of the dynamic nature of education, however, new CIP codes are frequently added to the list.

The first 2-digits are the first cut off of detail and describe the general discipline of the program. For example, any program with a CIP that starts with 14 is within the Engineering discipline; anything with a 22 is within the legal discipline.

The next 2 digits increase the level of detail, and the final 2-digits provide the highest level of detail.

Find CIP codes at *http://nces.ed.gov/ipeds/cipcode*

Enter 1st CIP Code: 1 4 . 1 8 0 1

Enter 2nd CIP Code 1 4 . 1 8 0 1

Print Name	Approved	Not Approved	Sign Name	
S. Nair	X		Sudhaba Nair	1/10/14
1) Academic Unit 1 Curriculum Committee Chair			1) Sign	Date
S. NAIR	X		"	"
1) Academic Unit 2 Curriculum Committee Chair			1) Sign	Date
S. Acharya			S Acharya	1/10/14
2) Academic Unit 1 Head			2) Sign	Date
"			S Acharya	1/10/14
2) Academic Unit 2 Head			2) Sign	Date
3) Academic Unit 1 College Dean			3) Sign	Date
3) Academic Unit 2 College Dean			3) Sign	Date
4) Undergraduate Studies Committee Chair (program 1)			4) Sign	Date
5) Graduate Studies Committee Chair (program 2)			5) Sign	Date
6) Faculty Council Chair			6) Sign	Date
7) Provost			7) Sign	Date

Note: The Office of the Provost should return an approved copy of this form, with all supporting documentation, to the Offices of Undergraduate and Graduate Academic Affairs.

Undergraduate Program Type: Co-terminal degree BS MSE and MAS MSE

Total Undergraduate Program Credit Hours: 147

Program Description:

The Mechanical, Materials, and Aerospace Engineering (MMAE) Department currently offers interdisciplinary Co-terminal degree programs in which BS students in mechanical engineering and aerospace engineering can complete a MAS degree in *Mechanical and Aerospace Engineering* OR *Materials Science and Engineering.* Co-terminal degrees provide an attractive alternative that allows students to deepen their knowledge in their major area of study. What is currently lacking is a Co-terminal degree program for BS students in Materials Science and Engineering. As there is an increasing desire for engineers in materials related industries to have master's degrees and a deeper understanding of advanced techniques and concepts, a new Co-terminal degree program is being proposed to fulfill this gap.

- BS Materials Science and Engineering + MAS Materials Science and Engineering

The existing BS degree program in Materials Science and Engineering includes a total of five elective courses (one free elective, three technical electives and one engineering elective); therefore, co-terminal degree students can use three of these electives to take courses that meet requirements toward the MAS degree. In this way, there is no effect on the requirements for the bachelor's degrees. The proposed Co-terminal degree program can be completed in ten semesters of full-time study at IIT.

Program Benefits:

The BS MSE and MAS MSE Co-terminal degree allows students to accelerate completion of the bachelors and masters degrees by taking advantage of the nine credit hours of courses that are shared between both degrees. In addition, students may be able to maintain their undergraduate status throughout completion of both degrees, thereby possibly allowing them to continue IIT financial aid throughout the five-year co-terminal degree program.

The MSE undergraduate degree program gives students a broad background in Materials Science and Engineering. Meanwhile, the proposed Co-terminal degree program allows students to pursue a focused specialization within materials science and engineering as well pursue an interdisciplinary set of courses tailored to the student's interests.

Program Resources:

Because the subject Co-terminal degrees are combinations of existing bachelors and masters of engineering degrees, no new resources in terms of faculty or facilities are required. There are no new courses that will need to be introduced. The only additional

load on faculty will be in advising students interested in and pursuing the Co-terminal degree programs; this will be handled primarily by existing MSE faculty members.

Approximately, one-third of the undergraduate MSE students enroll in graduate programs either here at IIT or elsewhere following completion of their BS degree. The proposed Co-terminal degree program may be an attractive option for enticing many of these students to stay at IIT to complete their graduate studies. As not all such students will meet the admission requirements, we expect approximately 3 to 8 students to be pursuing the four co-terminal degrees on an ongoing basis.

Marketing and Advising:

The co-terminal degree programs will be marketed to prospective and current students in the following ways:

1) Highlighted at events for prospective students, e.g. open houses, "Meet Your Major" presentations, etc.
2) Current students will be informed of options for graduate study, including co-terminal degrees, through annual events held for MMAE students.
3) Individual advising sessions will address student-specific questions and issues that arise.

In addition to the student's undergraduate faculty advisor, specific advising sessions related to the co-terminal degree requirements will be held by the MMAE Dept on an annual basis. We will proactively advise all of our undergraduate students to help them decide whether to seek a single BS degree, dual BS degrees, co-terminal degrees, or pursue MS/PhD.

Admission and Continuation Requirements:

Students pursuing a bachelor's degree in materials science and engineering are eligible to apply for the co-terminal degree programs if they meet the following requirements:

1) Completed at least 60 credit hours of undergraduate study, of which 24 credit hours must have been completed at IIT.
2) Minimum cumulative GPA of 3.25 at time of application.

The application process is the same as that for all applicants to MAS programs within the department.

In order to maintain active status in the co-terminal degree programs, students must maintain a 3.0 cumulative GPA.

Program Details:

- BS MSE Requirements (117 credit hours)
- MAS MSE Requirements (21 credit hours) MAS MSE Requirements (21 Credit hours)

- Shared BS/MAS Requirements (9 credit hours) Shared BS/MAS Requirements (9 credits)
- FE = Free Elective
- TE = Technical Elective
- Although 9 credit hours are "double counted", none of the required courses for the BS degree are counted toward the MAS. There is no effect on the BS degree requirements.
- MSE Graduate Electives defined as one of the following courses:
    - *MMAE 567 Fracture Mechanisms*
    - *MMAE 568 Diffusion*
    - *MMAE 570 Computational Methods in Materials Processing*
    - *MMAE 571 Microstructural Characterizations of Materials*
    - *MMAE 576 Materials & Process Selection*
    - *MMAE 578 Fiber Composites*
    - *MMAE 579 Advanced Materials Processing*
    - *MMAE 533 Fatigue & Fracture Mechanics*
    - *MMAE 561 Solidification & Crystal Growth*
    - *MMAE 562 Design of Modern Alloys*
    - *MMAE 564 Dislocations & Strengthening Mechanisms*
    - *MMAE 566 Problems in High-Temperature Materials*

BS Materials Science and Engineering + ME Materials Science and Engineering

Semester 1: 15 Credits

MATH 151 – Calculus I
CHEM 123 – Principles of Chemistry I
MMAE 100 – ITP
HUM/SS Elective

Semester 2: 17 Credits

MATH 152 – Calculus II
PHYS 123 – General Physics I
CS 104 – Intro to Programming I
MS 201 – Materials Science
HUM/SS Elective

Semester 3: 17 Credits

MATH 251 – Calculus III
PHYS 221 – General Physics II
MMAE 200 – Intro. to Mechanics
MMAE 232 – Design for Innovation
HUM/SS Elective

Semester 4: 16 Credits

MATH 252 – Intro. Differential Eqns.
MMAE 202 – Mechanics of Solids II
PHYS 224 – General Physics III
HUM/SS Elective
Free Elective

Semester 5: 16 Credits

MMAE 320 – Thermodynamics
MMAE 365 – Structure & Properties of Materials I
MMAE 370 – Materials Lab I
MMAE 373 Instrumentation and Measurements Lab
HUM/SS Elective

Semester 6: 15 Credits

MMAE 372 – Aerospace Materials Lab
MMAE 463 – Structure and Properties of Materials II
MMAE 465 – Electrical, Magnetic and Optical Properties of Materials
Technical Elective
HUM/SS Elective

Semester 7: 12 Credits

MMAE 470 – Introduction to Polymer Science
MMAE 476 – Materials Laboratory II
MMAE 485 – Manufacturing Processes
MMAE 501 – Engr. Analysis I

Semester 8: 12 Credits

MMAE 472 – Adv. Aerospace Materials
IPRO 497 – IPRO I
MSE Graduate Elective
MSE Graduate Elective

Semester 9: 12 Credits

MMAE 520 Adv. Thermodynamics
MMAE 563 – Adv. Mech. Metallurgy
MMAE 569 – Adv. Phys. Metallurgy
Technical Elective

Semester 10: 15 Credits

Technical Elective
Engineering Elective
IPRO 497 – IPRO II
HUM/SS Elective
MSE Graduate Elective

126 BS + 30 MAS – 9 shared = 147 total credit hours

MMAE Co-terminal Degrees Summary

Existing Co-terminal Degrees within MMAE (MAS = master of engineering, i.e. non-thesis masters):

- BS Mechanical Engineering + MAS Mechanical and Aerospace Engineering
- BS Aerospace Engineering + MAS Mechanical and Aerospace Engineering
- BS Mechanical Engineering + MAS Materials Science and Engineering
- BS Aerospace Engineering + MAS Materials Science and Engineering

New Co-terminal Degree within MMAE (MAS = master of engineering, i.e. non-thesis masters):

- BS Materials Science and Engineering + MAS Materials Science and Engineering

Advantages for Students:

- Complete bachelors and masters degrees in five years.
- Up to 9 credit hours can be shared between both degrees.
- It *may* be possible to maintain IIT financial aid through completion of both bachelor's and master's degrees (considered on a case-by-case basis).
- Currently, there are no Co-terminal degree programs for undergraduate MSE students. The proposed program fills a gap and allows BS MSE students to participate in a distinctive Co-terminal degree program
- Co-terminal degrees for BS ME + MAS MSE and BS AE + MAS MSE already exist

Minimum Admission Requirements:

- 3.25 GPA at time of application.
- 60 credit hours of undergraduate study completed (24 at IIT).

Status:

- The BS MSE and MAS MSE Co-terminal degree programs have been discussed by the MMAE faculty during Fall 2016 semester and approved unanimously.