

Rose-Hulman Institute of Technology Course Catalog

Communications Systems Certificate	Optical Communications Certificate
Consulting Engineering Program Certificate	Power Certificate
Integrated Circuit Testing Certificate	Semiconductor Materials and Devices Certificate
International Studies Certificate	

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Communications Systems Certificate

Certificate Advisor: Dr. Yong Jin Kim

Take all of these required courses:

ECE 300 Continuous-Time Signals Systems

ECE 380 Discrete-Time Signals and Systems

MA 381 Introduction to Probability with Applications to Statistics

Plus any four courses from the following list. Additional courses not in this list may be approved by the Certificate Advisor.

ECE 310 Communication Systems

ECE 312 Communication Networks

ECE 412 Software Defined Radio

ECE 414 Wireless Systems

ECE 512 Probability, Random Processes, and Estimation

ECE 553 Radio-Frequency Integrated Circuit Design

CSSE 432 Computer Networks

MA 476 Algebraic Codes

CONSULTING ENGINEERING PROGRAM CERTIFICATE

Through the generosity of J. B. Wilson, a prominent consulting engineer of Indianapolis, a program was established in 1973 to emphasize career opportunities in the field of consulting engineering and to provide selected courses which would be beneficial to students interested in consulting engineering careers.

Listed below is a program guide of recommended courses for a student interested in consulting engineering. This is not a degree program but is a supplement to the normal engineering degree programs. Some of the courses are in addition to the normal engineering degree programs and may result in a student earning more credits than are required for the B.S. degree in a specific discipline.

Students desirous of pursuing the Consulting Engineering Program should enroll in the Program by filing a declaration-of-intent form with the Program advisor, who serves as Chair of the Program. In order to be certified as having completed the Program, a student is required to successfully complete the prescribed list of courses, complete the

requirements for a degree in Engineering, and take the Fundamentals of Engineering examination prior to graduation.

Upon completion of the program, students will receive a Certificate of Completion at the time of their graduation from Rose-Hulman Institute of Technology. Completion of the program will be noted on the student's official transcript but not on the diploma. The Consulting Engineer Program advisor is Dr. Kevin Sutterer P.E., Ph.D., Department of Civil and Environmental Engineering.

[Download the Consulting Engineering Intention Form](#)

Course	Credit
EM 102 Graphical Communications for Civil Engineers	2
Or	
EM 104 Graphical Communications	
Or	
BE 118 Design Thinking & Communication	
Or	
ENGD 100 Design & Communication Studio	
ENGL H290 Technical Communications	4
Or	
ENGD 250 Human-Computer Interfaces Studio	
ECON S253 Managerial Economics	4
Or	
EMGT 432/532 Technical Entrepreneurship	
CE303 Engineering Economy	4
Or	
CHE416 Chemical Engineering Design 1	
Or	
EMGT 467 Economic Analysis of Engineering Projects	
EMGT552 Business Law for Technical Managers	4
Or	
EMGT 551 Intellectual Property for Scientists and Engineers	
MDS 450 Consulting Engineering Seminar	2

Total

24

Exceptions to these program course requirements require approval by the Consulting Engineering Program Advisor.

Registration for & sitting for the Fundamentals of Engineering Exam is required.

INTEGRATED CIRCUIT TESTING CERTIFICATE

Testing integrated circuits is a critical element in the integrated circuit industry. In fact, testing has become the bottle-neck for many companies, with inefficient test programs preventing the release of products onto the market. With few colleges offering courses in this area, students at RHIT have a unique specialization opportunity, making them marketable and extremely valuable in the integrated circuit industry.

This certificate intends to provide the student with a solid background in test and product engineering and broaden that background with other courses pertinent to the test and product engineering field. A strong test/product engineer requires knowledge about integrated circuit design, systems design, board design, semiconductor fabrication, and statistics. Therefore, courses in these areas can be chosen for the elective portion of the certificate.

The test and product engineering certificate could be completed by an electrical or computer engineering student without overloading if the certificate courses are mapped to all but one of the Area, Technical, and Free electives. Electives have been chosen so that students can pursue the semiconductor certificate or a math minor in conjunction.

Certificate Requirements

ECE351: Analog Electronics is required.

Two of the three testing courses are required.

ECE557: Analog Test and Product Engineering

ECE558: Mixed-Signal Test and Product Engineering

ECE531: Digital Test and Product Engineering

Three of ten elective courses are required.

ECE551: Digital VLSI

ECE552: Analog Integrated Circuit Design

ECE553: RF Integrated Circuit Design

ECE343: High-Speed Digital Design (required for CPE program)

ECE416: Intro to MEMS

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For further information about the certificate program, please contact Tina Hudson (HUDSON@ROSE-HULMAN.EDU).

INTERNATIONAL STUDIES CERTIFICATE

Certificate Advisor: Dr. Andreas Michel

In addition to the International Studies major, Rose-Hulman offers a certificate in International Studies. Like the major, the certificate is designed to introduce students to the diversity and complexity of the globalized world in which they will be working. Students may choose courses from a variety of disciplines, historical periods, and geographical areas from the list below.

Certificate Requirements (36 credits)

1. HUM H199 or SOC S199 Introduction to International Studies (4 credits)
2. First-year modern language proficiency (three courses, 12 credits)
3. Five courses with international studies content (20 credits) from this list:

ANTH S101 Introduction to Anthropology

HIST H422 The Industrial Revolution in Global Context
HUM H311 German Colonialism
HUM H380 Literature and Human Rights in Latin America
MUSI H301 Musics of the Global South
POLS S102 International Relations
POLS S103 Comparative Politics
POLS S200 Politics of the Global Economy
POLS S301 European Politics and Government
POLS S303 The European Union
POLS S304 British Politics and Government

1. Course substitutions can be made with the consent of the International Studies Coordinator.
2. Courses counted for the International Studies certificate **may not be counted for HSSA minors**—except that modern foreign language courses may be used to fulfill modern language requirements in one additional minor.
3. Students who complete the requirements for the International Studies Major cannot also be awarded the International Studies Certificate.

Optical Communications Certificate

Faculty advisors: Drs. Alisafae, Duree, Joenathan, Reza, Siahmakoun, and Granieri

Rose-Hulman has become a leader in providing opportunities for students to choose a great mainstream degree program with flexibility to speak globally to serve the needs of the 21st century.

speed optical data and information links and networks. At the end of the program the student will be expected to:

1. Understand the fundamental operation characteristics of high-speed optoelectronic

**SEMICONDUCTOR MATERIALS AND DEVICES
CERTIFICATE**

COURSE	HOURS	COURSE TITLE
ME 415	4	Corrosion and Engineering Materials
CHE 314	4	Heat Transfer
CHE 315	4	Material Science and Engineering
CHE 440	4	Process Control
CHE 441	4	Polymer Engineering
CHEM 441	4	Inorganic Chemistry I
CHEM 451	4	Organic Structure Determination
CHEM 457	4	Synthetic Polymer Chemistry
CHEM 462	4	Physical Polymer Chemistry
MA 381	4	Intro to Probability with Applications to Statistics
MA 385	4	Quality Methods
MA 487	4	Design of Experiments

Overall aim of the Certificate

A certificate holder will understand how semiconductor devices work, have practical experience in the main stages of device production, have practical experience in the more common forms of device testing and characterization, and have broad understanding of the mechanical and chemical properties of the material used.

A Certificate holder will be well suited for jobs requiring an understanding of semiconductor devices and their production. These jobs include not only those directly related to device fabrication, but also those involved with testing and trouble-shooting electronic equipment and the design of machines that contain electronic equipment. The experience in simple device fabrication that the Certificate provides is particularly useful for future engineers in “process” industries.

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**Rose-Hulman
Institute of Technology**
5500 Wabash Avenue
Terre Haute, IN 47803
812-877-1511