**ECE Department and CS Department Co-Terminal Degree:
Bachelor of Science in Computer Engineering / Master of Computer Science
and
Bachelor of Science in Computer Engineering / Master of Science in Computer Science**

**Program Description**.

The objective of these programs is to enable interested undergraduate students in computer engineering to integrate completion of their Bachelor of Science program with continuation into a professional master's degree in computer science, the Master of Computer Science, or into a research oriented master's degree in computer science, the Master of Science in Computer Science. Graduates thus combine study in both the computer engineering and the computer science disciplines, culminating in education at the master's degree level. The integration of the combined BS/MAS or BS/MS program enables completion in five years. Students enter the co-terminal program going into their third year of study, and they plan the fourth year of studies so that it leads into and supports their planned area of emphasis during the fifth year. The program encourages qualified IIT undergraduates to complete graduate studies at IIT and enter professional practice having attained a master's level education.

The undergraduate portion of the curriculum for this co-terminal degree program puts emphasis on both theory and practical applications of computer engineering. Computer engineering involves the design and application of computer hardware and computer software. Computer hardware consists of the physical components that implement a computer system: processor and memory chips, circuit boards, and peripheral devices. Computer software consists of computer programs that accomplish a specific task using sequences of simple, programmable steps. Computers have become an integral part of many large systems that require sophisticated control, including automobiles, medical instrumentation, telecommunication systems, and factory automation. Computers are a driving force behind many of today’s exciting new technologies, including wireless communications, interactive multimedia, and high-speed computer networks. Computer engineers must have detailed knowledge of both hardware and software to design, build and use complex information processing systems for a wide range of applications.

The objectives of the Bachelor of Science component of this co-terminal degree program are to produce computer engineering graduates who are prepared to

* enter their profession and make intellectual contributions to it,
* embark on a lifelong career of personal and professional growth,
* take advanced courses at the graduate level.

The graduate portion of the curriculum for this co-terminal degree provides advanced study in computer science. Those who pursue the Master of Science are prepared for entry into a Ph.D. program in computer science or into a research and development career in industry in the field of computer science. Those who pursue the Master of Computer Science are prepared for careers as working computer science professionals in business and industry. Specializations in business, software engineering, networking and telecommunications, and information systems are available.

**Bachelor of Science in Computer Engineering / Master of Computer Science Co-Terminal Degree**.

*Required Courses Cr.-hr.*

**ECE major requirements** 28
ECE 100, 211, 213, 218, 242, 311, 441, 485

**Computer Science Major Requirements** 16
CS 115, 116, 330, 331, 351, 450

**Mathematics Requirements** 24
MATH 151, 152, 251, 252, 474, plus MATH 333 or 471

**Physics Requirements** 11
PHYS 123, 221, 224

**Chemistry Requirement** 3
CHEM 122

**Engineering Science Course Requirement** 3
MMAE 200 or MMAE 320

**Humanities and Social Sciences Requirements** 21
(per General Education specifications)

**Junior Computer Engineering Elective** 3 to 4
ECE 307, 308, 312, or 319

**Science Elective** 3
BIOL 105, BIOL 107, BIOL 114, BIOL 115, MS 201, or CHEM 126

**Professional Computer Engineering Elective** 3
CS 440 or CS 455

**Hardware-design Elective** 4
ECE 429 or ECE 446

**Computer Systems/Software Requirements** 6
CS 425, CS 487

**Interprofessional Projects** 6

**Graduate Programming Core Elective** 3
CS 511, CS 512, CS 525, CS 540, CS 541, CS 546, or CS 551

**Graduate Systems Core Elective** 3
CS 542, CS 544, CS 547, CS 550, CS 555, CS 560, or CS 586

**Graduate Theory Core Elective** 3
CS 530, CS 533, CS 535, CS 536, or CS 538

**Graduate Level Computer Science Electives** 12
500-level or higher CS or CSP courses from the IIT CS Department; may include
at most 6 cr.-hr. of CS short courses, and may include at most 6 cr.-hr. of CS 597

**TOTAL** 152 to 153

**BSCPE/MCS Curriculum**

**First Semester** **Cr-hr** **Second Semester** **Cr-hr**
MATH 151 Calculus I 5 MATH 152 Calculus II 5
CHEM 122 Principles of Chemistry I 3 PHYS 123 General Physics I 4
CS 115 Obj.-Oriented Programming I 2 BIOL 105, 107, 114 or 115, or CHEM 126, or MS 201 3
ECE 100 Introduction to the Profession 3 CS 116 Obj.-Oriented Programming II 2
Social Science Elective 3 HUM 102 or 104 or 106 3
**TOTAL** **16** **TOTAL** **17**

**Third Semester** **Cr-hr** **Fourth Semester** **Cr-hr**
MATH 252 Intro. to Differential Equations 4 MATH 251 Multivar. & Vector Calculus 4
PHYS 221 General Physics II 4 PHYS 224 Gen. Physics III for Engineers 3
ECE 211 Circuit Analysis I 4 ECE 213 Circuit Analysis II 4
ECE 218 Digital Systems 3 ECE 242 Digital Computers/Computing 3
CS 331 Data Structures & Algorithms 3 CS 330 Discrete Structures 3
**TOTAL** **18** **TOTAL** **17**

**Fifth Semester** **Cr-hr** **Sixth Semester** **Cr-hr**
MMAE 200 or 320 3 ECE 307, 308, 312, or 319 3/4
ECE 311 Engineering Electronics 4 CS 450 Operating Systems 3
CS 351 Systems Programming 3 MATH 474 Probability & Statistics 3
MATH 333 or 471 3 IPRO Interprofessional Project 3
Humanities Elective (300-level or higher) 3 Social Science Elective 3
**TOTAL** **16** **TOTAL** **15/16**

**Seventh Semester** **Cr-hr** **Eighth Semester** **Cr-hr**
ECE 441 Microcomputers 4 CS 487 Software Engineering 3
ECE 485 Computer Org. & Design 3 ECE 429 or 446 4
CS 425 Database Organization 3 IPRO Interprofessional Project 3
CS 440 or CS 455 3 Social Science Elective 3
Humanities Elective (300-level or higher) 3 Humanities or Social Science Elective 3
**TOTAL** **16** **TOTAL** **16**

**Ninth Semester** **Cr-hr** **Tenth Semester** **Cr-hr**
CS 511, 512, 525, 540, 541, 546, or 551 3 500-level CS Elective 3
CS 542, 544, 547, 550, 555, 560, or 586 3 500-level CS Elective 3
CS 530, 533, 535, 536, or 538 3 500-level CS Elective 3
500-level CS Elective 3
**TOTAL** **12** **TOTAL** **9**

**Bachelor of Science in Computer Engineering / Master of Science in Computer Science Co-Terminal Degree**.

*Required Courses Cr.-hr.*

**ECE major requirements** 28
ECE 100, 211, 213, 218, 242, 311, 441, 485

**Computer Science Major Requirements** 16
CS 115, 116, 330, 331, 351, 450

**Mathematics Requirements** 24
MATH 151, 152, 251, 252, 474, plus MATH 333 or 471

**Physics Requirements** 11
PHYS 123, 221, 224

**Chemistry Requirement** 3
CHEM 122

**Engineering Science Course Requirement** 3
MMAE 200 or MMAE 320

**Humanities and Social Sciences Requirements** 21
(per General Education specifications)

**Junior Computer Engineering Elective** 3 to 4
ECE 307, 308, 312, or 319

**Science Elective** 3
BIOL 105, BIOL 107, BIOL 114, BIOL 115, MS 201, or CHEM 126

**Professional Computer Engineering Elective** 3
CS 440 or CS 455

**Hardware-design Elective** 4
ECE 429 or ECE 446

**Computer Systems/Software Requirements** 6
CS 425, CS 487

**Interprofessional Projects** 6

**Graduate Programming Core Elective** 3
CS 511, CS 512, CS 525, CS 540, CS 541, CS 546, or CS 551

**Graduate Systems Core Elective** 3
CS 542, CS 544, CS 547, CS 550, CS 555, CS 560, or CS 586

**Graduate Theory Core Elective** 6
CS 530, CS 533, CS 535, CS 536, or CS 538

**Graduate Level Computer Science Electives** 11
500-level or higher CS or CSP courses from the IIT CS Department; may include
at most 6 cr.-hr. of CS short courses, and may include at most 6 cr.-hr. of CS 597;
cr.-hr. limitations apply to the optional Master's thesis or Master's project

**TOTAL** 154 to 155

**BSCPE/MSCS Curriculum**

**First Semester** **Cr-hr** **Second Semester** **Cr-hr**
MATH 151 Calculus I 5 MATH 152 Calculus II 5
CHEM 122 Principles of Chemistry I 3 PHYS 123 General Physics I 4
CS 115 Obj.-Oriented Programming I 2 BIOL 105, 107, 114 or 115, or CHEM 126, or MS 201 3
ECE 100 Introduction to the Profession 3 CS 116 Obj.-Oriented Programming II 2
Social Science Elective 3 HUM 102 or 104 or 106 3
**TOTAL** **16** **TOTAL** **17**

**Third Semester** **Cr-hr** **Fourth Semester** **Cr-hr**
MATH 252 Intro. to Differerntial Equations 4 MATH 251 Multivar. & Vector Calculus 4
PHYS 221 General Physics II 4 PHYS 224 Gen. Physics III for Engineers 3
ECE 211 Circuit Analysis I 4 ECE 213 Circuit Analysis II 4
ECE 218 Digital Systems 3 ECE 242 Digital Computers/Computing 3
CS 331 Data Structures & Algorithms 3 CS 330 Discrete Structures 3
**TOTAL** **18** **TOTAL** **17**

**Fifth Semester** **Cr-hr** **Sixth Semester** **Cr-hr**
MMAE 200 or 320 3 ECE 307, 308, 312, or 319 3/4
ECE 311 Engineering Electronics 4 CS 450 Operating Systems 3
CS 351 Systems Programming 3 MATH 474 Probability & Statistics 3
MATH 333 or 471 3 IPRO Interprofessional Project 3
Humanities Elective (300-level or higher) 3 Social Science Elective 3
**TOTAL** **16** **TOTAL** **15/16**

**Seventh Semester** **Cr-hr** **Eighth Semester** **Cr-hr**
ECE 441 Microcomputers 4 CS 487 Software Engineering 3
ECE 485 Computer Org. & Design 3 ECE 429 or 446 4
CS 425 Database Organization 3 IPRO Interprofessional Project 3
CS 440 or CS 455 3 Social Science Elective 3
Humanities Elective (300-level or higher) 3 Humanities or Social Science Elective 3
**TOTAL** **16** **TOTAL** **16**

**Ninth Semester** **Cr-hr** **Tenth Semester** **Cr-hr**
CS 511, 512, 525, 540, 541, 546, or 551 3 CS 530, 533, 535, 536, or 538 3
CS 542, 544, 547, 550, 555, 560, or 586 3 500-level CS Elective 3
CS 530, 533, 535, 536, or 538 3 500-level CS Elective 3
500-level CS Elective 3 500-level CS Elective 2/3
**TOTAL** **12** **TOTAL** **11/12**