

Rochester INSTITUTE OF TECHNOLOGY

Minor Program proposal form

KGCOE

**Department of Computer Engineering - CMPE**

**Name of Minor:** **Computer Engineering Minor**

**Brief description of the minor to be used in university publications**

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| The computer engineering minor provides students with a foundation in digital systems design, an understanding of computer organization, and an introduction to embedded systems programming. Students build on this core through elective courses in the areas of hardware design, architectures, networks and systems. *The minor is closed to students majoring in computer engineering, computer engineering technology, electrical engineering technology or telecommunications engineering technology.* |

**1.0 Minor Program Approvals**

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|  | Approval request date: | Approval granted date: |
| Academic Unit Curriculum Committee | 2/29/2012 | 3/12/2012 |
| College Curriculum Committee | 5/5/2017 (revision) | 5/11/2017 |
| Inter-College Curriculum Committee |  |  |

**2.0 Rationale:**

A minor at RIT is a related set of academic courses consisting of no fewer than 15 semester credit hours leading to a formal designation on a student's baccalaureate transcript

How is this set of academic courses related?

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| These courses are a representative sample of Computer Engineering that allow students to explore the discipline, including a core foundation as well as their selected specializations. |

**3.0 Multidisciplinary involvement:**

If this is a multidisciplinary minor spanning two or more academic units, list the units and their role in offering and managing this minor.

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| N/A |

**4.0 Students ineligible to pursue this minor:**

The purpose of the minor is both to broaden a student's college education and deepen it in an area outside the student’s major program. A minor may be related to and complement a student’s major, or it may be in a completely different academic/professional area.   It is the responsibility of the academic unit proposing a minor and the unit’s curriculum committee to indicate any home programs for which the minor is not a broadening experience.

Please list below any home programs whose students will not be allowed to pursue this minor, provide the reasoning, and indicate if this exclusion has been discussed with the affected programs:

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| KGCOE CMPE (already part of major program)CAST CPET (Electrical, Computer and Telecommunications Engineering Technology) (repeats rather than broadens students’ educational experience) |

**5.0 Minor Program Structure, Sequence and Course Offering Schedule:**

Describe the structure of the proposed minor and list all courses, their anticipated offering schedule, and any prerequisites.

* All minors must contain at least fifteen semester credit hours;
* Minors may be discipline-based or interdisciplinary;
* In most cases, minors shall consist of a minimum of two upper division courses (300 or above) to provide reasonable breadth and depth within the minor;
* As per New York State requirements, courses within the minor must be offered with sufficient frequency to allow students to complete the minor within the same time frame allowed for the completion of the baccalaureate degree;
* Provide a program mask showing how students will complete the minor.

Narrative of Minor Program Structure:

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| **I. Policies*** A minor in Computer Engineering is open to all undergraduate students matriculated at RIT with exceptions listed in 4.0 above.
* Student must complete at least 15 semester credit hours of approved Computer Engineering courses to earn a minor in Computer Engineering.
* At least 9 of the 15 semester credit hours must be Computer Engineering courses not required by a student’s home program.
* Posting of the minor on a student's transcript requires passing the minor courses with a minimum grade point average of 2.0 in the minor courses.
* A minor may not be added after the granting of the bachelor's degree.

**II. Course Requirements**1. ***Prerequisites:*** Students entering the Computer Engineering Minor should have the following prerequisites.
* Mathematical capability at the level of MATH 181 Project-Based Calculus I, MATH 172 Calculus B, or MATH 190 Discrete Mathematics for Computing.
* Programming capability at the level of CSCI 141 Computer Science I.
1. ***Core Courses:*** All students must complete the following three core courses: CMPE 160 Digital System Design I, CMPE 250 Assembly Language Programming, and CMPE 350 Computer Organization.

***Exceptions****:** ***Core course waiver***: Students that have taken a course outside Computer Engineering that has significant overlap with one of the above core courses may request Computer Engineering Department approval for waiving that course requirement. For example, CMPE 160 can be waived for students with EEEE 120 credit.
* ***Core course substitution***: Students that have taken a course outside Computer Engineering that has substantial overlap with a core course may request Computer Engineering department approval for the substitution of that core course with a Computer Engineering elective course.
1. ***Elective Courses***: All students must complete at least two approved Computer Engineering courses outside the core.
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Required and elective (optional) courses for CE minor with the required prerequisites are shown in the following Table.

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| --- | --- | --- | --- | --- | --- | --- | --- |
| Course Number & Title | SCH | Required | Optional | Fall | Spring | Annual/Biennial | Prerequisites |
| CMPE 160 Digital System Design I | 3 | YES |  | x | x | Annual |  |
| CMPE 250Assembly Language | 4 | YES |  | x | x | Annual | CMPE-160 Digital System Design I, programming skills at CSCI-141 Computer Science I level |
| CMPE 350 Computer Organization | 3 | YES |  | x | x | Annual | CMPE-160 Digital Systems Design I, CMPE-250 Assembly Language Programming |
| **Electives***Choose two of the following* |  |  |  |  |  |  |  |
| CMPE 260 Digital System Design II | 4 |  | YES | x | x | Annual | CMPE-160 Digital System Design I, programming skills at CSCI-141 Computer Science I level |
| CMPE 380 Applied Programming  | 3 |  | YES | x | x | Annual | MATH-231 Differential Equations, MATH -241 Linear Algebra, programming skills at CSCI-141 Computer Science I level |
| CMPE 460 Interface & Digital Electronics  | 4 |  | YES | x | x | Annual | EEEE-381 Electronics I, CMPE-250 Assembly Language  |
| CMPE 480 Digital Signal Processing | 3 |  | YES | x | x | Annual | CMPE-380 Applied Programming, MATH-231 Differential Equations, MATH -241 Linear Algebra |
| CMPE 530 Digital IC Design | 3 |  | YES | x | x | Annual | CMPE-260 Digital System Design II and EEEE-381 Electronics I |
| CMPE 550 Computer Architecture | 3 |  | YES | x | x | Annual | CMPE-350 Computer Organization |
|  |  |  |  |  |  |  |  |
| CMPE 570 Data and Communication Networks | 3 |  | YES | x | x | Annual | MATH-251 Probability & Statistics I |
| CMPE 655 Multiple Processor Systems | 3 |  | YES |  | x | Annual | CMPE-550 Computer Architecture |
| CMPE 660 Reconfigurable ComputingCMPE-661 HW SW Design for Cryptographic Applications | 33 |  | YESYES | x | x | AnnualAnnual | CMPE-260 Digital System Design IICMPE-260 or CMPE-240 or graduate standing in CMPE-MS |
| CMPE 663 Real Time & Embedded Systems | 3 |  | YES | x |  | Annual | CMPE-380 or SWEN-220 or standing in CMPE-MS |
| CMPE 664 Modeling of Real-Time Systems  | 3 |  | YES |  | x | Annual | SWEN-220 or CSCI-251 or CMPE-380 or graduate standing in CMPE-MS |
| CMPE 665 Perf Eng of Real Time and Embedded Systems | 3 |  | YES |  | x | Annual | SWEN-220 or CSCI-251 or CMPE-380 or graduate standing in CMPE-MS |
| CMPE 677 Machine Intelligence | 3 |  | YES |  | x | Annual | CMPE-380 and CMPE-480 and MATH-251 or graduate standing in CMPE-MS or CMPE-BS/MS |
| CMPE-685Computer VisionCMPE-731Design & Test of Multi-Core ChipsCMPE-755High Performance ArchitecturesCMPE-770Wireless Networks  | 3333 |  | YESYESYESYES | XX | xX | AnnualAnnualAnnualAnnual | CMPE-480 or standing in CMPE-MSCMPE-530 or CMPE-630CMPE-350 or standing in CMPE-MSCMPE-570 or CMPE-670 |

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| Total credit hours: 16 |

**Two Typical Program Masks:**

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| **Second/Third Year** | **Fourth Year** | **Fifth Year** |
| CMPE 160 Digital System Design I (3)  | CMPE 250Assembly Language (4) | CMPE 350 Computer Organization (3) | CMPE 551 Computer Architecture (3) | CMPE 663 Real Time & Embedded Systems (3) |  |
| **Total Credit Hours: 16** |

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| **Second/Third Year** | **Fourth Year** | **Fifth Year** |
| CMPE 160 Digital System Design I (3)  | CMPE 250Assembly Language (4) | CMPE 350 Computer Organization (3) | CMPE 380 Applied Programming (3) | CMPE 460 Interface & Digital Electronics (4) |  |
| **Total Credit Hours: 17** |