|  |
| --- |
| **Orientation and Professional Development (Credit: 1 hour)** |
| These courses introduce the opportunities and resources our institute and curriculum can offer you as you work to achieve your career goals. They also provide the skills to work effectively and successfully in the engineering profession. |
| **Foundational Mathematics and Science (Credit: 31 hours)** |
| These courses stress the basic mathematical and scientific principles upon which the engineering discipline is based. |
| **Computer Engineering Technical Core (Credit: 36 hours)** |
| These courses stress fundamental concepts and basic laboratory techniques that comprise the common intellectual understanding of computer engineering. |
| **Technical Electives (Credit: 27 hours)** |
| These courses stress cross-discipline study, the rigorous analysis and design principles practiced in the major subdisciplines of computer engineering, for example cyberphysical systems; foundations and theory; software and languages; algorithms and mathematical tools; trust, reliability, security; networking, mobile and distributed computing; big data analytics and systems; artificial intelligence, robotics, cybernetics etc. |
| **Liberal Education (Credit: 18 hours)** |
| The liberal education courses develop students’ understanding of human culture and society, build skills of inquiry and critical thinking, and lay a foundation for civic engagement and lifelong learning. These include the campus General Education (GenEd) requirements in the humanities, social sciences, and cultural studies. To satisfy the campus General Education requirements, students must complete:•Six hours of campus GenEd courses in **Humanities & Arts**. These courses must be taken for a grade.•Six hours of campus GenEd courses in **Social & Behavioral Sciences**. These courses must be taken for a grade.•One campus GenEd course in **Western/Comparative Culture(s)**. This course must be taken for a grade.•One campus GenEd course in **Non-Western/U.S. Minority Culture(s)**. This course must be taken for a grade. |
| **Composition (Credit: 6 hours)** |
| These courses teach fundamentals of expository writing. |
| **Free Electives (Credit: 9 hours)** |
| These unrestricted electives give the student the opportunity to explore any intellectual area of unique interest. This freedom plays a critical role in helping students to define research specialties. Students are encouraged to take cross-discipline courses as free electives. |
| **ZJU Liberal Education Compulsory (Credit: 28 hours)** |
| These courses introduce the modern history, development, policies, etc. about Chinese society, help student to improve their English, and keep a healthy lifestyle. |
| **Suggested Curricula by Category** |
| **Category** | **Course Number** | **Course Title** | **Credit** |
|
| **Orientation and Professional Development** | ENGR 100 | Engineering Orientation | **1** |
|  | subtotal | **1** |
| **Foundational Mathematics and Science** | MATH 221 | Calculus Ⅰ | **4** |
| MATH 231 | Calculus Ⅱ | **3** |
| MATH 241 | Calculus Ⅲ | **4** |
| MATH 286 | Intro to Differential Eq Plus  | **4** |
| CHEM 102 | General ChemistryⅠ | **3** |
| CHEM 103 | General Chemistry LabⅠ | **1** |
| PHYS 211 | University Physics: Mechanics  | **4** |
| PHYS 212 | University Physics: Elec& Mag | **4** |
| PHYS 213 | Univ Physics: Thermal Physics | **2** |
| PHYS 214 | Univ Physics: Quantum Physics | **2** |
|  | subtotal | **31** |
| **Computer Engineering Technical Core** | ECE 110 | Intro to Electronics | **3** |
| ECE 120 | Intro to Computing | **4** |
| CS 173 | Discrete Structures | **3** |
| ECE 210 | Analog Signal Processing | **4** |
| ECE 220 | Computer Systems & Programming | **4** |
| CS 225 | Data Structures | **4** |
| ECE 313 | [Probability with EngrgApplic](#note) | **3** |
| CS 374 | Introduction to Algorithms & Models of Computation | **4** |
| ECE 385 | Digital Systems Laboratory | **3** |
| ECE 391 | Computer Systems Engineering | **4** |
|  |  | subtotal | **36** |
| **Composition** | RHET 101 | Principles of Writing | **3** |
| RHET 102 | Principles of Research | **3** |
|  | subtotal | **6** |
| **Liberal Education Electives** | GenEd Elective 1 |  | **3** |
| GenEd Elective 2 |  | **3** |
| GenEd Elective 3 |  | **3** |
| GenEd Elective 4 |  | **3** |
| GenEd Elective 5 |  | **3** |
| GenEd Elective 6 |  | **3** |
|  | subtotal | **18** |
| **Technical Electives** | CS 101 | Intro to Computing: Engr & Sci | **3** |
| ECE 411 | Computer Organization & Design  | **4** |
| ECE445 | Senior Design Project Lab   | **4** |
| Technical Elec1 |  | **3** |
| Technical Elec2 |  | **3** |
| Technical Elec3 |  | **3** |
| Technical Elec4 |  | **4** |
| Technical Elec5 |  | **3** |
|  | subtotal | **27** |
| **Free Electives** | Free Elec 1 |  | **3** |
| Free Elec 2 |  | **3** |
| Free Elec 3 |  | **3** |
|  | subtotal | **9** |
|  |  | **subtotal from UIUC** | **128** |
| **ZJU Liberal Education Compulsory** | LAW 1001 | Character Cultivation and Basic Laws | 2.5 |
| HIST 2001 | Modern Chinese History | 2.5 |
| PHIL 2001 | Intro. To Fundamental Principles of Marxism | 2.5 |
| PS 2011 | Thoughts and Ideology of Socialism with Chinese Characteristics | 4 |
| PS 1001 | Chinese Social Development Situation and Policies Ⅰ | 1 |
| PS 2001 | Chinese Social Development Situation and Policies Ⅱ | 1 |
| ENGL 1001 | Integrated English Ⅰ | 4 |
| ENGL 1002 | Integrated English Ⅱ | 2 |
| PE 1001 | Physical Education Ⅰ | 1 |
| PE 1002 | Physical Education Ⅱ | 1 |
| PE 2001 | Physical Education Ⅲ | 1 |
| PE 2002 | Physical Education Ⅳ | 1 |
| PE 3001 | Physical-fitness Test Ⅰ | 0.5 |
| PE 4001 | Physical-fitness Test Ⅱ | 0.5 |
| MITR 1001 | Military Training  | 2 |
| MITR 2001 | Military Theory | 1.5 |
|  |  | **subtotal from ZJU** | **28** |
|  | **Total** | **156** |

**Sample Schedule by Semester for Computer Engineering**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Semester | No | Course Number | Course Title | Credit Hours |
| 0 | 1 | MITR 1001 | Military Training  | 2 |
| 1 | 1 | Rhet 101 | Principles of Writing | 3 |
| 1 | 2 | Chem 102 | General Chemistry I | 3 |
| 1 | 3 | Chem 103 | General Chemistry Lab I | 1 |
| 1 | 4 | Math 221 | Calculus I | 4 |
| 1 | 5 | ECE 110 | Intro to Electronics | 3 |
| 1 | 6 | CS 101 | Introduction to Computing: Engineering & Science | 3 |
| 1 | 7 | Eng 100  | Engineering Orientation | 1 |
| 1 | 8 | ENGL 1001 | Integrated English I | 4 |
| 1 | 9 | PE 1001 | Physical Education I | 1 |
| 1 | 10 | PS 1001 | Chinese Social Development Situation and Policies I |  |
| 2 | 4 | Rhet 102 | Principles of Research | 3 |
| 2 | 1 | Math 231 | Calculus II | 3 |
| 2 | 2 | Phys 211 | University Physics: Mechanics  | 4 |
| 2 | 3 | GenEd Elective 1 | GenEd Elective 1 | 3 |
| 2 | 5 | ECE 120 | Intro to Computing | 4 |
| 2 | 6 | Eng 199 | Undergraduate Open Seminar |  |
| 2 | 7 | ENGL 1002 | Integrated English II | 2 |
| 2 | 8 | PE 1002 | Physical Education II | 1 |
| 2 | 9 | PS 1001 | Chinese Social Development Situation and Policies I | 1 |
| 3 | 1 | Math 241  | Calculus III | 4 |
| 3 | 2 | Phys 212   | University Physics: Elec& Mag | 4 |
| 3 | 3 | ECE 220               | Computer Systems & Programming | 4 |
| 3 | 4 | CS 173 | Discrete Structures | 3 |
| 3 | 5 | GenEd Elective 2 | GenEd Elective 2 | 3 |
| 3 | 6 | SEM | Seminar |  |
| 3 | 7 | LAW 1001 | Character Cultivation and Basic Laws | 2.5 |
| 3 | 8 | PE 2001 | Physical Education Ⅲ | 1 |
| 3 | 9 | MITR 2001 | Military Theory | 1.5 |
| 4 | 1 | Math 286 | Intro to Differential Eq Plus  | 4 |
| 4 | 2 | Phys 213 | Univ Physics: Thermal Physics | 2 |
| 4 | 3 | Phys 214 | Univ Physics: Quantum Physics | 2 |
| 4 | 4 | ECE 210 | Analog Signal Processing | 4 |
| 4 | 5 | CS 225 | Data Structure | 4 |
| 4 | 6 | PS 2011 | Thoughts and Ideology of Socialism with Chinese Characteristics | 4 |
| 4 | 7 | PE 2002 | Physical Education Ⅳ | 1 |
| 5 | 1 | ECE 310              | Digital Signal Processing | 4 |
| 5 | 2 | **ECE 313** | Probability with Engrg Applic | 3 |
| 5 | 3 | **ECE 314** | Probability with Engrg Applic Lab | 1 |
| 5 | 4 | ***ECE 385*** | Digital Systems Laboratory | 3 |
| 5 | 5 | **ECE 374** | Introduction to Algorithms & Models of Computation | 4 |
| 5 | 6 | GenEd Elective 3 | GenEd Elective 3 | 3 |
| 6 | 1 | **ECE 391** | Computer Systems Engineering | 3 |
| 6 | 2 | Tech Elective | Tech Elective | 3 |
| 6 | 3 | COMPE ACE | COMPE ACE | 3 |
| 6 | 4 | COMPE ACE | COMPE ACE | 3 |
| 6 | 6 | GenEd Elective 4 | GenEd Elective 4 | 3 |
| 6 | 7 | PE 3001 | Physical-fitness Test Ⅰ | 0.5 |
| 6 | 8 | HIST 2001 | Modern Chinese History | 2.5 |
| 6 | 9 | PHIL 2001 | Intro. To Fundamental Principles of Marxism | 2.5 |
| 7 | 1 | **ECE 411** | Computer Organization & Design  | 4 |
| 7 | 2 | **ECE 345** | Innovation and Engineering Design | 3 |
| 7 | 3 | COMPE TECH | COMPE TECH | 3 |
| 7 | 4 | GenEd Elective 5 | GenEd Elective 5 | 3 |
| 7 | 5 | PS 2001 | Chinese Social Development Situation and Policies Ⅱ |  |
| 8 | 1 | ECE 445 | Senior Design Project Lab   | 4 |
| 8 | 2 | COMPE TECH | COMPE TECH | 3 |
| 8 | 3 | COMPE TECH | COMPE TECH | 3 |
| 8 | 5 | GenEd Elective 6 | GenEd Elective 6 | 3 |
| 8 | 4 | PE 4001 | Physical-fitness Test Ⅱ | 1 |
| 8 | 5 | PS 2001 | Chinese Social Development Situation and Policies Ⅱ | 0.5 |
|  |  |  | Total | 156 |

**Courses as Technical Electives**

These courses are chosen from the list of technical electives. They include courses in ECE, other engineering areas, and the basic sciences and mathematics. The elective requirement gives each student freedom to define a technical course of study in computer engineering of considerable breadth and focus. Choices should be made with care, planning, and consultation with an adviser.

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| 27 to include at least | Selected from the **List of Technical Electives (LTE)** |
| (i) 1 course | Chosen from the EE Foundations Courses (see LTE) |
| (ii) 3 courses | Chosen from the list of Advanced Computing Electives (see LTE) |
| (iii) one of | ECE 411 - Comp Organization & DesignECE 445 - Senior Design Project Lab ECE 496 - Senior Research Project AND ECE 499 - Senior Thesis  |

**List of Technical Electives**

**Civil &Env. Eng. (CEE):** 310, 330, 408, 410, 416, 430, 447, 491

**Computer Science (CS):**  173\*\*, 225\*\*, 242, 357, 373, 410, 411, 412, 413, 414, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 431, 433, 436, 438, 439 ,440, 445, 446, 450, 460, 461, 463, 465, 466, 467, 473, 475, 476; 477, 481, 484; CS 398 & 498 Special Topics, as approved.

**ECE†:** 297, 304, 307, 310, 311, 314, 329\*\*\*, 330, 333, 340\*\*\*, 342, 343, 350, 361, 374\*\*, 380, 391\*\*, 395, 396, 397, 402, 403, 408, 411, 412, 414, 415, 416, 417, 418, 419, 420, 422, 424, 425, 428, 431, 432, 435, 437, 438, 439, 441, 444, 445\*\*\*, 446, 447, 448, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 462, 463, 464, 465, 466, 467, 468, 469, 470, 472, 473, 476, 478, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 495, 496, 499; ECE 398 & 498 Special Topics, as approved.

**Mechanical Eng. (ME):** 300, 310, 320, 330, 340, 350, 370, 371, 400, 401, 402, 403, 404, 410, 411, 412, 420, 430, 431, 440, 445, 450, 451, 452, 460, 461, 471, 472, 485, and 487

**1 of 6 EE Foundation Courses:** 310, 329, 330, 340, 361, 486

**Advanced Computing Elective Courses:**

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| **Advanced Computing Electives*****NOTE: Some ECE classes are cross listed with CS*** |
| CS |   | ECE |
| 3 hrs | CS 357 or | Numerical Methods I |  | 3 hrs | ECE 408/ CS 483 | Applied Parallel Programming |
| 3 hrs | CS 411 | Database Systems |   | 4 hrs | ECE 411 | Computer Organization & Design |
| 3 hrs | CS 412 | Introduction to Data Mining |   | 3 hrs | ECE 412 | Microcomputer Laboratory |
| 3 hrs | CS 414 | Multimedia Systems |   | 3 hrs | ECE 419/ CS 460 | Computer Security Lab |
| 3 hrs | CS 418 | Interactive Computer Graphics |   | 3 hrs | ECE 422/ CS 461 | Computer Security I |
| 3 hrs | CS 419 | Production Computer Graphics |   | 3 hrs | ECE 424/ CS 463 | Computer Security II |
| 3 hrs | CS 420 | Parallel Programming: Scientists and Engineers  |   | 3 hrs | ECE 425 | Intro to VLSI System Design |
| 3 hrs | CS 421 | Progrmg Languages & Compilers |   | 3 hrs | ECE 428/ CS 425 | Distributed Systems |
| 3 hrs | CS 423 | Operating Systems Design |   | 3 hrs | ECE 438/ CS 438 | Computer Networking Laboratory |
| 3 hrs | CS 424 | Real Time Systems |   | 3 hrs | ECE 439/ CS 439 | Wireless networks |
| 3 hrs | CS 425 | Distributed Systems |   | 3 hrs | ECE 462 | Logic Synthesis |
| 3 hrs | CS 426 | Compiler Construction |   | 4 hrs | ECE 470 | Introduction to Robotics |
| 3 hrs | CS 431 | Embedded Systems |   | 3 hrs | ECE 478/ CS 477 | Formal Software Devel. Methods |
| 3 hrs | CS 435 | Computer Networking Laboratory |   | 3 hrs | ECE 491/ CS 450 | Numerical Analysis |
| 3 hrs | CS 438 | Communication Networks |   | 3 hrs | ECE 492/CS 420 | Parallel Programming: Scientists and Engineers |
| 3 hrs | CS 440 | Artificial Intelligence |   | 3 hrs | ECE 498 RC | Smart Phone Computing and Applications |
| 3 hrs | CS 446 | Machine Learning |   |   |   |   |
| 3 hrs | CS 450 | Numerical Analysis |   |   |   |   |
| 3 hrs | CS 461 | Computer Security I |   |   |   |   |
| 3 hrs | CS 475 | Formal Models of Computation |   |   |   |   |
| 3 hrs | CS 476 | Programming Verification |   |   |   |   |
| 3 hrs | CS 477 | Formal Software Devel Methods |   |   |   |   |
| 3 hrs | CS 483 | Applied Parallel Programming |   |   |   |   |
| 3 hrs | CS 498 MP | Logic for Computer Science |   |   |   |   |
| 3 hrs | CS 498 VR | Virtual Reality |   |   |   |   |
| 3 hrs | CS 498 AML | Applied Machine Learning  |   |   |   |   |

 \* except seminars and special topics courses, which may be reviewed in the Advising Office
\*\* Elective for EEs, required for CompEs \*\*\* Elective for CompEs