Electrical Engineering 2014

Major: Electrical Engineering

Degree Type: B.S.E.E.

Required Degree Credits to Graduate: 126

General Education Requirements

First Year Experience (F):

| Thet real Experience (1) | • | |
|--|---|----|
| UNIV 189 | Skills For Academic Success (Students transferring in 24 or more credits do not need to take UNIV 189.) | 1 |
| Communication (C): | | |
| ENGL 110 | College Composition I | 3 |
| ENGL 120 | College Composition II | 3 |
| One Course in Upper Leve | el Writing. Select one of the following: | 3 |
| ENGL 320 | Business and Professional Writing | |
| ENGL 321 | Writing in the Technical Professions | |
| ENGL 324 | Writing in the Sciences | |
| ENGL 459 | Researching and Writing Grants and Proposal | |
| COMM 110 | Fundamentals of Public Speaking | 3 |
| Quantitative Reasoning (| (R): | |
| MATH 165 | Calculus I | 4 |
| Science & Technology (S | S): | |
| CHEM 121 | General Chemistry I | 3 |
| PHYS 251 | University Physics I | 4 |
| PHYS 252 | University Physics II | 4 |
| Select one of the following | co-req labs | 1 |
| CHEM 121L | General Chemistry I Laboratory | |
| PHYS 251L | University Physics I Laboratory | |
| PHYS 252L | University Physics II Laboratory | |
| Humanities & Fine Arts (| A): Select from current general education list | 6 |
| Social & Behavioral Sciences (B): Select from current general education list | | 6 |
| Wellness (W): Select from current general education list | | 2 |
| Cultural Diversity (D): Se | lect from current general education list | |
| Global Perspectives (G): | Select from current general education list | |
| Total Credits | | 43 |
| | | |

2

Major Requirements

| General Education Requirements | | | | | |
|--|--|----|--|--|--|
| Electrical Engineering Core Requi | General Education Requirements 40 Electrical Engineering Core Requirements | | | | |
| ECE 111 | Introduction to Electrical and Computer Engineering | 3 | | | |
| ECE 173 | Introduction to Computing * | 3 | | | |
| ECE 275 | Digital Design * | 4 | | | |
| ECE 311 | Circuit Analysis II | 4 | | | |
| ECE 321 | Electronics I | 5 | | | |
| ECE 331 | Energy Conversion | 4 | | | |
| ECE 341 | Random Processes | 3 | | | |
| ECE 343 | Signals & Systems | 4 | | | |
| ECE 351 | Applied Electromagnetics | 4 | | | |
| ECE 376 | Embedded Systems | 4 | | | |
| ECE 401 | Design I (capstone) | 1 | | | |
| ECE 403 | Design II (capstone) | 2 | | | |
| ECE 405 | Design III (capstone) | 3 | | | |
| MATH Courses Required | | | | | |
| MATH 129 | Basic Linear Algebra * | 2 | | | |
| MATH 166 | Calculus II * | 4 | | | |
| MATH 265 | Calculus III (w/ vectors) * | 4 | | | |
| MATH 266 | Introduction to Differential Equations * | 3 | | | |
| Other Courses Required | | | | | |
| EE 206 | Circuit Analysis I * | 4 | | | |
| ENGR 402 | Engineering Ethics and Social Responsibility | 1 | | | |
| ECE Electives | Select 9 credits of ECE 400 level electives (excluding 494 and 496) | 9 | | | |
| Includes the cross listed courses of ECE/IME 427; ECE/IME 429; ECE/PHYS 411; & ECE/PHYS 411L | | | | | |
| Tech Electives: Select 12 credits f | rom the following: | 12 | | | |
| ABEN 456 | Biobased Energy | | | | |
| BIOL 150 & 150L | General Biology I and General Biology I Laboratory | | | | |
| BIOL 220 & 220L | Human Anatomy and Physiology I and Human Anatomy and Physiology I Laboratory | | | | |
| BIOL 221 & 221L | Human Anatomy and Physiology II and Human Anatomy and Physiology II Laboratory | | | | |
| BIOL 315 & 315L | Genetics and Genetics Laboratory | | | | |

| Fluid Mechanics Bruid Bruid Bruid Mechanics Bruid Brui | | |
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| CEME 488 Nanotechnology and Nanomaterials CHEM 102 General Chemistry III A 122L and General Chemistry III A 341L Organic Chemistry III A 341L and Organic Chemistry III CHEM 382 Organic Chemistry III A 342L and Organic Chemistry III CHEM 384 Physical Chemistry II CHEM 385 Physical Chemistry II A CHEM 471 and Physical Chemistry II A CHEM 425 Inorganic Chemistry II A CHEM 425 Inorganic Chemistry I A CHEM 429 and Inorganic Chemistry I Laboratory CSCI 181 Computer Science II CSCI 222 Discrete Mathematics CSCI 233 Theoretical Computer Science II CSCI 338 Theoretical Computer Science II CSCI 338 Theoretical Computer Science II CSCI 436 Introduction to Artificial Intelligence CSCI 437 Comparative Programming Languages CSCI 438 Microcomputer Ciraphics CSCI 437 Algorithm Analysis CSCI 437 Operating Systems Concepts | | |
| CHEM 122 | | • |
| 8. 122L and General Chemistry II Laboratory CHEM 341 Organic Chemistry II 8. 341L and Organic Chemistry III 8. 342L and Organic Chemistry III 8. 342L and Organic Chemistry III CHEM 365 Physical Chemistry III CHEM 365 Physical Chemistry III 8. CHEM 471 and Physical Chemistry III 8. CHEM 429 inorganic Chemistry III 8. CHEM 429 and Inorganic Chemistry III 8. CHEM 429 and Inorganic Chemistry Laboratory CSCI 161 Computer Science II CSCI 182 Discrete Marhematics CSCI 222 Discrete Marhematics CSCI 336 Theoretical Computer Science II CSCI 337 Comparative Programming Languages CSCI 326 Database Systems CSCI 428 Introduction to Artificial Intelligence CSCI 426 Introduction to Artificial Intelligence CSCI 437 Algorithm Analysis CSCI 447 Algorithm Analysis CSCI 447 Operating Systems Concepts CSCI 447 Operating Systems Design | | |
| CHEM 341 and Organic Chemistry I Laboratory CHEM 342 Organic Chemistry II Laboratory CHEM 342 and Organic Chemistry II Laboratory CHEM 364 Physical Chemistry II Laboratory CHEM 365 Physical Chemistry II Chemistry II CHEM 365 Physical Chemistry II CHEM 365 Physical Chemistry II CHEM 367 Physical Physica | | |
| 8 341. and Organic Chemistry II Laboratory CHEM 342 | | · |
| 8.342. and Organic Chemistry I CHEM 364 Physical Chemistry I CHEM 365 Physical Chemistry I & CHEM 477 and Physical Chemistry Laboratory CHEM 425 Inorganic Chemistry Laboratory CSCI 161 Computer Science II CSCI 222 Discrete Mathematics CSCI 3336 Theoretical Computer Science II CSCI 3366 Database Systems CSCI 3372 Comparative Programming Languages CSCI 428 Introduction to Artificial Intelligence CSCI 488 Microcomputer Graphics CSCI 489 Foundations of Computer Networks CSCI 474 Operating Systems Design CSCI 475 Operating Systems Design CSCI 477 Object-Oriented Systems CSCI 478 Operating Systems Design CSCI 477 Object-Oriented Systems CSCI 478 Operating Systems Design CSCI 479 Object-Oriented Systems CSCI 470 Object-Oriented Systems CSCI 471 Object-Oriented Systems CSCI 472 Object-Oriented Systems <td< td=""><td>& 341L</td><td></td></td<> | & 341L | |
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| CHEM 425 Inorganic Chemistry I and Physical Chemistry Laboratory CHEM 425 Inorganic Chemistry Laboratory SCI 181 Computer Science II CSCI 222 Discrete Mathematics CSCI 335 Theoretical Computer Science II CSCI 336 Database Systems CSCI 346 Introduction to Artificial Intelligence CSCI 426 Introduction to Artificial Intelligence CSCI 437 Comparative Programming Languages CSCI 448 Microcomputer Graphics CSCI 458 Microcomputer Graphics CSCI 459 Foundations of Computer Networks CSCI 474 Operating Systems Design CSCI 475 Operating Systems Design CSCI 476 Operating Systems Design CSCI 477 Object-Oriented Systems ECE 374 Computer Organization and Architecture ECE 4374 Computer Organization and Architecture ECE 4374 Computer Organization and Architecture ECE 494 Individual Study (max. of 6 cr.) ECE 496 Field Experience (max. of 3 cr.) ECE 497 Engineering Economy IME 456 Program and Project Management IME 461 Ouality Assurance and Control MATH 270 Introduction to Abstract Mathematics MATH 429 Abstract Algebra II MATH 429 Linear Algebra II MATH 451 Real Analysis II MATH 452 Complex Analysis II MATH 453 Paris Differential Equations MATH 488 Numerical Analysis II MATH 489 Numerical Analysis II MATH 489 Numerical Analysis II ME 221 Engineering Mechanics II ME 222 Engineering Mechanics II ME 450 Renewable Energy Technology | & 342L | and Organic Chemistry II Laboratory |
| & OHEM 471 and Physical Chemistry Laboratory CHEM 425 Inorganic Chemistry Laboratory CSCI 161 Computer Science II CSCI 182 Discrete Mathematics CSCI 232 Discrete Mathematics CSCI 335 Theoretical Computer Science II CSCI 336 Database Systems CSCI 372 Comparative Programming Languages CSCI 472 Comparative Programming Languages CSCI 483 Microcomputer Graphics CSCI 489 Foundations of Computer Networks CSCI 476 Algorithm Analysis CSCI 477 Operating Systems Design CSCI 478 Operating Systems Design CSCI 477 Opject-Oriented Systems CSCI 477 Opject-Oriented Systems ECE 374 Computer Organization and Architecture ECE 498 Field Experience (max. of 6 cr.) ECE 498 Field Experience (max. of 3 cr.) EMG 310 Enterpretacy Prop | CHEM 364 | Physical Chemistry I |
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| ME 470 Renewable Energy Technology | | |
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| IVIICK 445 Animai Ceii Cuiture Techniques | | |
| | IVIIUK 445 | Animai Ceii Culture Techniques |

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| PHYS 350 | Modern Physics | |
|---------------|--|-----|
| PHYS 360 | Modern Physics II | |
| PHYS 413 | Lasers for Scientists and Engineers | |
| PHYS 415 | Elements of Photonics | |
| PHYS 485 | Quantum Mechanics I | |
| STAT 450 | Stochastic Processes | |
| STAT 451 | Bayesian Statistical Decision Theory | |
| STAT 468 | Probability and Mathematical Statistics II | |
| ZOO 460 | Animal Physiology | |
| Total Credits | | 126 |

^{*} No grade less than a C accepted in these courses and before enrolling in ECE 300 level courses, excluding ECE 311.

Degree Requirements and Notes

- A student must complete at least 60 semester credits of professional level course work in his/her program while in residence and enrolled in the
 college. Students transferring into the college from programs with professional accreditation are exempt from this residency requirement but are
 subject to the residency requirement of NDSU.
- Transfer Students Transfer courses with grades less than 'C' in Biology, Chemistry, Computer Science, Mathematics, Physics, and any type of engineering class will not be accepted as a major requirement.
- All Students Students are required to attain a grade of 'C' or better in ECE 173 Introduction to Computing, ECE 275 Digital Design, EE 206 Circuit Analysis I, and all required MATH courses.

Note: For students interested in pursuing one of the areas of specialization, lists of recommendations for specific electives are available from the ECE Department.