Postdisciplinary Engineer Curriculum

|  |
| --- |
| KERN FAMILY FOUNDATION HONORS BACHELOR OF SCIENCE DOUBLE MAJOR IN MAKER ENGINEERING (7077) & either BIOMEDICAL ENGINEERING (7048) OR CHEMICAL ENGINEERING (7033)with MINOR in NANOSCIENCE/NANOTECHNOLOGY (6050)2020-2021 CATALOG |
| Name |  | Student # |  |
| Advisor |  | Phone # |  |
|  | E-mail |  |
| Comments |
| COURSE # | COURSE | CR. | SEM. | GRADE |
| YEAR 1 - FALL SEMESTER |
| HON 1000 | Honors Entrepreneurially-Minded Learning (EML) | 1 |   |  |
| BIO 1010 | Biological Discovery 1 OR Honors equivalent | 3 |  |  |
| BIO 1030 | Introduction to Biotechnology for BME's only (can be postponed\*) | 1 |  |  |
| BIO 1045 | Introduction to Biomedical Engineering for BME's only (can be postponed to Year 2 Fall) | 1 |  |  |
| CHE 1101 | Intro to Chemical Engineering 1 (Process Flowsheeting + PowerPoint) | 2 |  |  |
| CHM 1101 | General Chemistry 1 OR Honors equivalent | 4 |  |  |
| COM 1101 | Composition and Rhetoric - Honors Version emphasizing entrepreneurship | 3 |  |  |
| MTH 1010  | Honors Calculus 1 (Prerequisite: MTH 1000 [OR high school algebra and trig and a passing score on the placement test])  | 4 |  |  |
|  | TOTAL | 17/19 |  |  |
| YEAR - 1 SPRING SEMESTER |
| AEE 1202 | Aerospace Practicum (CAD + design exp. w/machine shop + electronics) | 2 |  |  |
| CHE 1102 | Intro to Chemical Engineering 2 (Excel plotting, curve fitting, iterative solutions, & statistics) | 1 |  |  |
| CHM 1102 | General Chemistry 2 (Prerequisite: CHM 1101) OR Honors equivalent | 4 |  |  |
| MTH 1020 | Honors Calculus 2 (Prerequisite: MTH 1010) | 4 |  |  |
| PHY 1001 | Physics 1 (Prerequisite: MTH 1010; Co-requisite: MTH 1020) OR Honors equivalent | 4 |  |  |
| CSE 1509 | New Honors Computer Science (LabView, C++, Python, & G Code) | 3 |  |  |
|  | TOTAL | 18 |  |  |
| YEAR 2 - FALL SEMESTER |
| CHE 2101 | Chemical Process Principles 1 (Prerequisites: CHM 1101, MTH 1001) | 3 |  |  |
| CHM 2001  | Organic Chemistry 1 (Prerequisite: CHM 1102) for BME/ChE's | 3 |  |  |
| MAE 2081 OR BME 2081 | Applied Mechanics: Statics for MEE/AEE's OR Rigid Body Biomechanics for BME/ChE's | 3 |  |  |
| MTH 2001 | Calculus 3 (Prerequisite: MTH 1002/1020) | 4 |  |  |
| PHY 2002 | Physics 2 (Prerequisite: PHY 1001) | 4 |  |  |
| PHY 2091 | Physics Laboratory 1 (Co requisite: PHY 1001) OR Honors equivalent | 1 |  |  |
|  | TOTAL | 18/18 |  |  |
| YEAR 2 - SPRING SEMESTER |
| CHE 2102 OR BIO 3201  | Chemical Process Principles 2 (Prerequisites: CHE 2101, MTH 1002/1020; Co-requisite: CHM 1102) OR Anatomy & Physiology I (Prerequisites: BIO 1010) | 3 or 4 |  |  |
| CHE/CHM 1091  | Nanotechnology Lab 1 (Prerequisite: CHM 1001)  | 1 |  |  |
| CHE 3260 OR BME 3260  | Materials Science and Engineering (Prerequisites: CHM 1101, PHY 1001; Co-requisite: MTH 1002) for non-BME's OR Biomaterials (Prerequisites: BIO 1010 AND ... OR (Nanotechnology AND CHE 3260 AND MTH 2201) OR Graduate standing) for BME's | 3 |  |  |
| CHE 3265  | Materials Laboratory (Prerequisites: MTH 1002, PHY 2091; Co-requisite: CHE 3260) includes statistics and data analysis to satisfy ABET | 1 |  |  |
| ECE 4991 | Electric and Electronic Circuits (Prerequisites: PHY 2002, MTH 2001) | 3 |  |  |
| COM 1102 | Honors Writing About Literature (Prerequisite: COM 1101) emphasizing entrepreneurship | 3 |  |  |
| MTH 3200 | Honors Differential Equations/Linear Algebra (Prerequisite: MTH 1002) | 4 |  |  |
|  | TOTAL | 18/19 |  |  |
| YEAR 3 - FALL SEMESTER |
| CHE 3101 OR BME 3030 | Transport Processes (Prerequisite: CHE 2102; Co-requisite: MTH 2201/3200) OR Biofluid Mechanics (Prerequisite: PHY 2002; Co/Prerequisite: MTH 2201/3200) | 3 |  |  |
| CHE 4563/5563  | Materials Characterization Lab (Prerequisites: (CHE 3260 OR BME 3260) AND (CHM/CHE 1091))  | 3 |  |  |
| CHE 4240 OR BME 3240 | Advanced Computational Methods (Prerequisites: CHE 2102, MTH 2201/3200) OR Computational Methods for Biological Systems (MTH 2201/3200, MTH 2001/2010, AND BIO 1010)  | 3 |  |  |
| CHM 3001 OR BME 3081 | Physical Chemistry 1 (Prerequisites: CHM 2001, MTH 2001/2010; Co-requisite: PHY 2002) OR Biomechanics (Prerequisite: BME 2081) | 3 |  |  |
| CHE 4568/5568 OR BME 4568/5568 | The Basics of Making (Prerequisites: (MTH 1002/1020 prerequisite AND (CHE 3260 prerequisite OR BME 3260 prerequisite OR CSE 2410 prerequisite OR ECE 3551 co/ prerequisite) AND junior standing) OR Graduate standing) | 3 |  |  |
| CHM 2002 OR BIO 3202 | Organic Chemistry 2 (Prerequisite: CHM 2001) for ChE's OR Anatomy & Physiology 2 (Prerequisites: BIO 3201) for BME's | 3 |  |  |
|  | TOTAL | 18 |  |  |
| YEAR 3 - SPRING SEMESTER |
| CHE 3103 OR BME 4252 | Heat Transfer Processes (Prerequisites: CHE 2102, MTH 2201/3200 OR Biomedical Measurement and Instrumentation (Prerequisites: BIO 3201, ECE 4991)  | 3 |  |  |
| CHE 3104 OR BME 4241 | Mass Transfer Processes (Prerequisites: CHE 2102, MTH 2201/3200)) for ChE's OR Transport in Biological Systems (Prerequisites: MTH 2201/3200, 2001, and BIO 1010) for BME's  | 3 |  |  |
| BME 3222 | Biological Signals & Applications (Prerequisites: ECE 4991, MTH 2201/3200) | 3 |  |  |
| CHE 3110 OR MEE 3191 | Chemical (Prerequisite: CHE 2102) OR Mechanical (Prerequisites: CHM 1101, MTH 2001/2010, PHY 1001) Engineering Thermodynamics  | 3 |  |  |
| BME 4253 | Biomedical Measurement and Instrumentation Lab (Co/Prerequisite: BME 4252) for BME's only | 1 |  |  |
| COM 2223 | Scientific and Technical Communication (Prerequisite: COM 1102) OR (Allowed Substitution: COM 2370 Speech for transfer students) | 3 |  |  |
| CHE 4567/5567 OR BME 4050/5790 | Nanotechnology (Prerequisites: CHE 3260 OR CHM 2002 OR BME 3260 OR Graduate standing) | 3 |  |  |
|  | TOTAL | 18/19 |  |  |
| YEAR 4 - FALL SEMESTER |
| CHE 4122 OR MEE 4014 OR AEE 4014 OR ECE 4231  | Chemical (Prerequisites: CHE 2102, MTH 2201/3200) OR Mechanical (Prerequisites: MTH 2201/3200) OR Aerospace (Prerequisites: MTH 2201/3200) OR Electrical (Prerequisites: ECE 3222 or BME 3222) Engg. Process Control | 4 or 3 |  |  |
| BME 4292 | Biomedical (Prerequisites: BME 4191 OR (CHE 4181 AND The Basics of Making) Co/Prerequisite AND + Maker Program Admission) Engineering Senior Design I.  | 3 |  |  |
| CHE 3115 OR BME 3261  | CHE Processes Laboratory 1 (Prerequisites: CHE 3101, CHE 3103) OR Biomechanics and Biomaterials Lab (Prerequisites: PHY 2091, BME 3260, & BME 3081) | 2 or 1 |  |  |
| PHY 2092 | Physics Laboratory 2 (Prerequisite: PHY 2091; Co-requisite: PHY 2002) | 1 |  |  |
| CHE 4151 | Chemical Engineering Reactor Design (Prerequisites: CHE 3101, CHE 3103 OR New Alternate of CHE 2101, MEE 3191 Thermodynamics, BME Transport (BME 4241) | 3 |  |  |
| BME 4410/5500OR CHE 4131 | Double-Counted BME Restricted/Nanotech Elective: (Tissue Engineering BME 4410/5500 (Prerequisites: BME 3260 OR BME 5300 OR CHE 5300 OR (Nanotechnology AND CHE 3260 AND MTH 2201/3200) OR Graduate standing) OR Separations CHE 4131 (Prerequisites: CHE 3103, 3104, 3110) for ChE's | 3 |  |  |
|  | Humanities Core 1 Course\* (Prerequisite: COM 1102) for BME's OR Chemical Engineering Plant Design (CHE 4181; prerequisites: CHE 3101 and co/prerequisite of CHE 4131) | 3 |  |  |
|   | TOTAL | 19/17 |  |  |
| Year 4 - SPRING SEMESTER |
|   | HON 2000 Honors Seminar (Instructor Permission) OR Humanities Restricted Elective: any Bioethics (HUM 2570; req.'d for BME's), Logic (HUM 2510), Philosophy (HUM 2551, 2552, or 3531), non-ancient History of Science, Sci-Fi Film OR Books course (HUM 3274, 3276, 3352; Prerequisite: COM 1102. Some also have HUM Core Course 1 or 2. | 3 |  |  |
| BME 4193 | Biomedical (Prerequisites: BME 4192) Engineering Senior Design II | 3 |  |  |
| CHE 3260 or CHE 4182 | Materials Science and Engineering (Prerequisites: CHM 1101, PHY 1001; Co-requisite: MTH 1002) for BME's OR Chemical Engineering Plant Design 2 (Prerequisite: CHE 4181) for ChE's | 3 |  |  |
|  | Humanities Core Course 2\* (Prerequisite: COM 1102)  | 3 |  |  |
|  | Humanities Core Course 1\* (Prerequisite: COM 1102) for ChE's | 3 |  |  |
|  | Social Science Elective OR Economics Elective OR Marketing Principles (BUS 3610 (Prerequisite: Soph standing)) OR Management Principles (BUS 3501; Prerequisite: Soph standing)) OR Project Management (ENM 4201/5201 (Prerequisite: MTH 2201) OR Systems Engineering Principles (SYS 4310/5310 (Prerequisite: MTH 2201))  | 3 |  |  |
|  | TOTAL | 18/18 |  |  |
| Year 4 - SUMMER SEMESTER |
| MEE 2024 OR BIO 5515 OR BIO 5522 or CSE 4285 OR CHM 5111 OR BME 4410/5259 OR MEE 3024 | Visualization Requirement: Solids Modeling & 3D Mechanical Design Principles (Prerequisite: AEE 1202 OR MEE 1024) OR Pharmacology and Drug Design (Prerequisite: Grad Standing) OR Bioinformatics, Genomics and Proteomics OR Game Design (Prerequisite: CSE 2010) OR Advanced Topics in Physical Chemistry (Prerequisite: Grad Standing) OR Biomedical Imaging (Prerequisites: BIO 3201, MTH 2201/3200, PHY 2002) OR Computer-Aided Engineering (Prerequisites: MEE 2024, AEE 3083) | 3 |  |  |
|  | TOTAL CREDIT HOURS REQUIRED | 147/ 149 |  |  |
| Advisor | Program Chair |
| Date | Date |

|  |
| --- |
| Appendix 3.1 - KERN FAMILY FOUNDATION (KFF) MAKER MINOR (6060) |
| Name: Student #: | Major: Major Code:  |
| Minor Advisor: Dr. Jim Brenner | Major Advisor: |
| COURSE # | COURSE | CR. | SEM. | GRADE |
| *12 CREDITS OF REQUIRED COURSES (Group A):*  |
| HON 1000 | Entrepreneurially Minded Learning | 1 |  |  |
| CHE 3260 OR BME 3260 OR ECE 2111 OR ECE 4991 | Materials Science and Engineering (required for CHE's, MEE's, and AEE's) OR Biomaterials (required for BME's) OR Circuit Theory 1 (required for ECE's) OR Electrical and Electronic Circuits (required for all other engineers) | 3 |  |  |
| CHE 4568/5568 OR BME 4568/5568 | The Basics of Making | 3 |  |  |
| CHE 1101 | Introduction to Chemical Engineering 1 (required for ChE's) | 2 |  |  |
| CSE 150x | Computer Science (req'd for MEE's, AEE's, ECE's, & CS; preferably new CSE 1509) | 3 |  |  |
| *2+ CREDITS OF* | *CAD + Machine Shop Experience from Group B* |  |  |  |
| AEE 1202 | Aerospace Practicum (required for AEE's) | 2 |  |  |
| MEE 1024 | Introduction to Mechanical Engineering (required for MEE's) | 3 |  |  |
| OCE 2002 | Computer Applications in Ocean Engineering (required for OCE's) | 3 |  |  |
| CVE 1001 | Computer Applications Lab (required for CVE's) | 1 |  |  |
| CVE 2083 | Construction Measurements Lab (required for CVE's) | 1 |  |  |
| *+3 CREDITS OF* | *Signal Processing from Group C* |  |  |  |
| BME 3222 | Biosignals and Applications (required for BME's) | 3 |  |  |
| ECE 3222 | Signals and Systems (required for ECE's) | 3 |  |  |
| MEE 5316 | Mechatronics | 3 |  |  |
| *+3 CREDITS OF* | *Visualization Requirement from Group D* |  |  |  |
| BME 4410/5259 OR ECE 5259 | Introduction to Biomedical Imaging OR Medical Imaging | 3 |  |  |
| MEE 5553 | Advanced CAD and Design Automation | 3 |  |  |
| MEE 3024 | Computer-Aided Engineering (CAE; required for MEE's) | 3 |  |  |
| MEE 2024 | Solids Modeling & 3D Mechanical Design Principles (required for MEE's) | 3 |  |  |
| BIO 5515 | Pharmacology and Drug Design | 3 |  |  |
| BIO 5522 | Bioinformatics, Genomics and Proteomics | 3 |  |  |
| CHM 5111 | Advanced Topics in Physical Chemistry | 3 |  |  |
| CVE 3042 OR CVE 3052 | Water and Wastewater Systems for Land Development OR Municipal Water and Wastewater Systems (One or other req'd for CVE's) | 3 |  |  |
| CSE 4285 | Game Design | 3 |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| *+3 CREDITS OF* | *Group E Electives* |  |  |  |
| ECE 4991 | Electrical and Electronic Circuits (for ChE's only; other majors require it) | 3 |  |  |
| ECE 4342 | Virtual Instrumentation Lab  | 3 |  |  |
| CHE 4567/5567 OR BME 4050/5790 | Nanotechnology  | 3 |  |  |
| BME 4252 | Biomedical Measurements & Imstrumentation | 3 |  |  |
| BME 4410/5500 | Tissue Engineering | 3 |  |  |
| BME/CHE 5300 | Biomaterials | 3 |  |  |
| ECE 3551 | Microcomputer Systems 1 | 4 |  |  |
| MEE 5318 | Instrumentation and Measurement Systems | 3 |  |  |
| MEE 5650 | Robotics | 3 |  |  |
| MEE 5660 | Robotic Control | 3 |  |  |
| MEE 5552 | Design for Manufacturing Assembly | 3 |  |  |
| OCE 4531 | Instrumentation Design and Measurement Analysis | 3 |  |  |
|  |  |  |  |  |
|  | A second course from Group D | 3 |  |  |
|  | TOTAL CREDIT HOURS |  |  |  |
|  | TOTAL CREDIT HOURS REQUIRED | 24-25 |  |  |
|  *(\*) Course must be listed on a Course Substitution Form attached with the student’s Petition to Graduate* *APPROVALS* |
|  |  |
| Minor Advisor Date | CHE Program Chair Date |

 Major Advisor Date Major Program Chair Date