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| --- | --- |
| For Academic Affairs and Research Use Only | |
| Proposal Number | ECS02 |
| CIP Code: |  |
| Degree Code: |  |

**Program Modification Form**

**[X] Undergraduate Curriculum Council**

**[ ] Graduate Council**

|  |
| --- |
| **Modification Type: [ ]Admissions, [X]Curricular Sequence, or [ ]Other** |

Signed paper copies of proposals submitted for consideration are no longer required. Please type approver name and enter date of approval.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Department Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **COPE Chair (if applicable)** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Department Chair** | |  |  | | --- | --- | | Jason Causey | 3/17/2021 |   **Head of Unit (if applicable)** |
| |  |  | | --- | --- | | Jason Stewart | 3/17/2021 |   **College Curriculum Committee Chair** | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Undergraduate Curriculum Council Chair** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Director of Assessment** *(only for changes impacting assessment)* | |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **Graduate Curriculum Committee Chair** |
| |  |  | | --- | --- | | Abhijit Bhattacharyya | 3/18/2021 |   **College Dean** | |  |  | | --- | --- | | Alan Utter | 4/12/2021 |   **Vice Chancellor for Academic Affairs** |
| |  |  | | --- | --- | | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | Enter date |   **General Education Committee Chair (if applicable)** |  |

1. **Contact Person** (Name, Email Address, Phone Number)

Brandon Kemp

[bkemp@astate.edu](mailto:bkemp@astate.edu)

870.253.7370

1. **Proposed Change** (for undergraduate curricular changes please provide an 8-semester plan (appendix A), if applicable)

The proposed change is to introduce a Data Science Domain Study within the Bachelor of Science in Data Science and Data Analytics degree.

1. **Effective Date**

Fall 2021

1. **Justification –** *Please provide details as to why this change is necessary.*

The major in Data Science and Data Analytics leading to the Bachelor of Science includes emphasis in either Data Science or Data Analytics. This proposal provides a domain study option for students interested in practicing data analytics in engineering development of new products, technologies, and processes, as part of the new B. S. in Data Science and Data Analytics, in the Data Science emphasis. The domain study introduces students to the process of engineering design and computer-based analysis, engineering economics, sustainability, and conservation principles (conservation of energy, momentum, and charge) that are fundamental to engineering design.

**Bulletin Changes**

|  |
| --- |
| **Instructions** |
| **Please visit** [**http://www.astate.edu/a/registrar/students/bulletins/index.dot**](http://www.astate.edu/a/registrar/students/bulletins/index.dot) **and select the most recent version of the bulletin. Copy and paste all bulletin pages this proposal affects below. Please include a before (with changed areas highlighted) and after of all affected sections.**  **\*Please note: Courses are often listed in multiple sections of the bulletin. To ensure that all affected sections have been located, please search the bulletin (ctrl+F) for the appropriate courses before submission of this form.** |

**After Page 185, following the “Data Science and Data Analytics Program” section and before the heading on “Engineering Programs”**

**DOMAIN STUDIES**

**DOMAIN STUDY: Engineering**

**EMPHASIS: Data Science**

**SPONSORING COLLEGE: College of Engineering and Computer Science**

|  |  |  |
| --- | --- | --- |
| **First Year Making Connections Course** | | |
|  | Students must take ENGR 1402 Concepts of Engineering | |
| **General Education Requirements** | | |
|  | Students must take PHYS 2034 University Physics I to meet physical science requirement and BIOL 1001 along with either BIOL 1003 or BIOL 1063 to meet life science requirement. | |
|  |  |  |
| **Required Courses** | | **Sem. Hrs.** |
|  | ENGR 1412 Software Applications for Engineers | 2 |
|  | ENGR 2401 Applied Engineering Statistics | 1 |
|  | ENGR 2403 Statics | 3 |
|  | ENGR 2423 Electric Circuits I | 3 |
|  | ENGR 3433 Engineering Economics | 3 |
|  | ENGR 3443 Engineering Thermodynamics I | 3 |
|  | CE 3263 Introduction to Environmental Engineering | 3 |
|  | CHEM 1013 General Chemistry I | 3 |
|  | CHEM 1011 General Chemistry I Laboratory | 1 |
| **Domain Studies Total** | | **22** |

**Appendix A, 8-Semester Plan**

(**Referenced in #2** - **Undergraduate Proposals Only)**

*Instructions: Please identify new courses in italics*.

**Eight-Semester Degree Plan**

**Bachelor of Science in Data Science and Data Analytics**

**2021-2022**

**Data Science Track: Engineering**

Domain studies courses

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | | | | | | | | |
| **Year 1** | | | | | | | | | |
| **Fall Semester** | | | | |  | **Spring Semester** | | | |
| **Course No.** | | **Course Name** | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
| ENGR 1402 | | Concepts of Engineering | 2 |  |  | MATH 1054 | Precalculus Mathematics | 4 |  |
| MATH 1023 | | College Algebra | 3 | X |  | ENG 1013 | Composition II | 3 | X |
| ENG 1003 | | Composition I | 3 | X |  | ENGR 1412 | Software Applications for Engineers | 2 |  |
| Life Science Gen. Ed.,  BIOL 1003/ 1001  BIOL 1063/ 1001 | | Choose one:  Biological Science/ Lab People & Environment/ Lab | 4 | X |  | Gen Ed Social Science\* GEO 2613 HIST 1013 HIST 1023  SOC 2213  PSY 2013  POSC 1003  CMAC 1003 | Choose one:  Intro to Geography World Civ. to 1660 World Civ. Since 1660 Intro to Sociology Intro to Psychology Intro to Politics Intro to Mass Communication | 3 | X |
| HIST 2763  HIST 2773  POSC 2103 | | Choose one:  U.S. to 1876  U.S. since 1876  Intro to U.S. Government | 3 | X |  | COMS 1203 | Oral Communication | 3 | X |
|  | |  |  |  |  |  |  |  |  |
| **Total Hours** | |  | 15 |  |  | **Total Hours** |  | 15 |  |
|  | | | | |  |  | | | |
| **Year 2** | | | | | | | | | |
| **Fall Semester** | | | | |  | **Spring Semester** | | | |
| **Course No.** | **Course Name** | | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | **Hrs** | **Gen Ed** |
| MATH 2204 | Calculus I | | 4 |  |  | MATH 2214 | Calculus II | 4 |  |
| AGST 3503 | Geospatial Data Applications (DSDA 101) | | 3 |  |  | STAT 3233 | Applied Statistics I | 3 |  |
| CS 1114 | Concepts of Programming | | 4 |  |  | ENGR 2401 | Applied Engineering Statistics | 1 |  |
| PHYS 2034 | University Physics I | | 4 | X |  | *DATA 2004* | *Programming for Data Science* | 4 |  |
|  |  | |  |  |  | Gen Ed Social Science\* GEO 2613 HIST 1013 HIST 1023  SOC 2213  PSY 2013  POSC 1003  CMAC 1003 | Choose one:  Intro to Geography World Civ. to 1660 World Civ. Since 1660 Intro to Sociology Intro to Psychology Intro to Politics Intro to Mass Communication | 3 | X |
| **Total Hours** |  | | 15 |  |  | **Total Hours** |  | 15 |  |

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Year 3** | | | | | | | | | | |
| **Fall Semester** | | | | |  | **Spring Semester** | | | | |
| **Course No.** | **Course Name** | | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | | **Hrs** | **Gen Ed** |
| STAT 3133 | Applied Categorical Data Analysis | | 3 |  |  | STAT 3243 | Regression Analysis and ANOVA | | 3 |  |
| *DATA 3003* | *Applied Database and data mining* | | 3 |  |  | MATH 3243 | Linear Algebra (spring only) | | 3 |  |
| MATH 2183 | Discrete Structures | | 3 |  |  | CSED 4231 | Principles of Operating Systems | | 1 |  |
| ENGR 2403 | Statics | | 3 |  |  | CSED 4731 | Principles of Abstract structures | | 1 |  |
| CHEM 1013 | General Chemistry I | | 3 |  |  | CSED 4241 | Principles of Computer Organization | | 1 |  |
| CHEM 1011 | General Chemistry I Lab | | 1 |  |  | CS 4623 | Fundamentals of Data Science | | 3 |  |
|  |  | |  |  |  | ENGR 2423 | Electric Circuits I | | 3 |  |
| **Total Hours** | | | 16 |  |  | **Total Hours** | | | 15 |  |
|  |  | |  |  |  |  |  | |  |  |
| **Year 4** | | | | | | | | | | |
| **Fall Semester** | | | | |  | **Spring Semester** | | | | |
| **Course No.** | **Course Name** | | **Hrs** | **Gen Ed** |  | **Course No.** | **Course Name** | | **Hrs** | **Gen Ed** |
| *DATA 4003* | *Fundamental concepts in Design of Experiments* | | 3 |  |  | *DATA 4013* | *Data Science and Data Analytics Capstone* | | 3 |  |
| *DATA 3023* | *Data Visualization and Communication* | | 3 |  |  | *DATA 303V* | *Internship* | | 1 |  |
| CE 3263 | Intro to Environmental Engineering | | 3 |  |  | PHIL 3723 | Computers, Ethics, and Society | | 3 |  |
| ENGR 3433 | Engineering Economics | | 3 |  |  | ENGR 3443 | Engineering Thermodynamics I | | 3 |  |
| *DATA 3011* | *Seminar* | | 1 |  |  | MUS 2503 or  THEA 2503 or  ART 2503 | Fine Arts-Musical or Fine Arts-Theatre or  Fine Arts -Visual | | 3 | X |
| PHIL 1103 | Intro to Philosophy | | 3 | X |  |  |  | |  |  |
| **Total Hours** | | 16 | | |  | **Total Hours** | | 13 | | |
| **Total Upper-Level Hours** | | **45** | | |  | **Total Degree Hours** | | **120** | | |

Students requiring developmental course work based on low entrance exam scores (ACT, SAT, ASSET, COMPASS) may not be able to complete this program of study in eight (8) semesters. Developmental courses do not count toward total degree hours. **Students having completed college level courses prior to enrollment will be assisted by their advisor in making appropriate substitutions.  In most cases, general education courses may be interchanged between semesters.** A minimum of 45 hours of upper-level credit (3000-4000 level) is required for this degree. Mandatory state and institutional assessment exams will be required during your degree program. ***Failure to participate in required assessments may delay graduation.***