**Ogden College of Science and Engineering**

**Office of the Dean**

**745-4449**

**REPORT TO THE UNIVERSITY CURRICULUM COMMITTEE**

Date: November 8, 2011

The Ogden College of Science and Engineering submits the following action items for consideration:

1. New Business

|  |  |
| --- | --- |
| **Type of item** | **Description of Item & Contact Information** |
| Action | **Create a New Course**  MATH 306, Applied and Computational Linear Algebra  Contact: Mikhail Khenner, [mikhail.khenner@wku.edu](mailto:mikhail.khenner@wku.edu), x52797  Jonathan Quiton, [jonathan.quiton@wku.edu](mailto:jonathan.quiton@wku.edu), x52441 |
| Action | **Revise a Program**  Ref. #629, Bachelor of Science in Computer Science  Contact: Zhonghang Xia, [zhonghang.xia@wku.edu](mailto:zhonghang.xia@wku.edu), x56459 |
| Action | **Revise a Program**  Ref. #534, Civil Engineering  Contact: Shane M. Palmquist, [shane.palmquist@wku.edu](mailto:shane.palmquist@wku.edu), x52919 |

Proposal Date: 10/04/2011

**Ogden College of Science and Engineering**

**Department of Mathematics and Computer Science**

**Proposal to Create a New Course**

**(Action Item)**

Contact Person: Dr. Mikhail Khenner, [mikhail.khenner@wku.edu](mailto:mikhail.khenner@wku.edu), 745-2797

Dr. Jonathan Quiton, [jonathan.quiton@wku.edu](mailto:jonathan.quiton@wku.edu), 745-2441

1. **Identification of proposed course:**
   1. Course prefix (subject area) and number: MATH 306
   2. Course title: Applied and Computational Linear Algebra
   3. Abbreviated course title: Appl Comput Linear Algebra
   4. Credit hours and contact hours: 3.00
   5. Type of course: L
   6. Prerequisites: Math placement eligibility above MATH 116 or MATH 116 with grade of C or better, and MATH 183 or another college level 3-hour statistics course with grade of C or better; or MATH 136 or MATH 142 with grade of C or better.
   7. Course catalog listing: Basic concepts and computational techniques of matrix and linear algebra. Practical methods using computer software for small-to-large data sets. Applications in economics, finance, informatics, statistics, and social, engineering, physical and biological sciences**.** Computer assignments are required. Not accepted for credit toward a mathematics major or minor.

**2. Rationale:**

* 1. **Reason for developing the proposed course:** MATH 306 is a service course designed to meet the demand from departments at WKU that want their students to be exposed to calculations and computations in the field of linear algebra and to become aware of the range of applications. Skills that students will acquire in MATH 306 will help them succeed in applied, upper-division data analysis courses offered by those departments. MATH 306 is also designed for students enrolled in the proposed informatics program. Computer-aided matrix calculations, manipulations and geometric visualizations will be the central tool in demonstrating linear algebra concepts, and in applying the results in the context of data analysis.
  2. Projected enrollment in the proposed course: Approximately 30 students per year, based on the projected number of students in the proposed informatics program and students from other programs.
  3. Relationship of the proposed course to courses now offered by the department: The department currently offers MATH 307: Introduction to Linear Algebra designed for math and science majors. Its required prerequisites are MATH 136 (Calculus I) and either EE 180 (Digital Circuits) or Phil 215 (Elementary Logic). MATH 307 approaches the study of linear algebra from the formal mathematical/analytic viewpoint, while MATH 306 will use a heuristic approach via hands-on calculations and geometric interpretation.
  4. Relationship of the proposed course to courses offered in other departments: No other course of this nature exists in the University’s other departments.
  5. Relationship of the proposed course to courses offered in other institutions:. East Tennessee State University offers MATH 2010 Linear Algebra, with topics including those in the proposed course and with the prerequisite course in analytic geometry, quadratic equations, and additional pre-calculus topics. Eastern Michigan University offers MATH 118 Linear Models and Probability, with topics including solutions of systems of linear equations using matrix row-reduction, as well as applications, and with the prerequisite pre-calculus course. Marshall University has MATH 329 Elementary Linear Algebra with the prerequisite of a pre-calculus course or a Math ACT of 27.

1. **Discussion of proposed course:**
   1. Course objectives: Students will

* Develop understanding of basic concepts in matrix and linear algebra
* Develop practical skills in analytical solutions of small matrix problems
* Develop ability to use computer software for the solution of larger matrix problems
* Develop ability to apply linear algebra skills to problems in various disciplines
  1. Content outline.
* Storage of large data sets in computer memory
* Basic vector/matrix computations
* Solution of linear systems using direct (iteration-free) methods
* Determinants of matrices and their applications
* Basics of computation of eigen-vectors and eigen-values and the singular

value decomposition

* Software for numerical linear algebra
* Applications
  1. Student expectations and requirements: Students are expected to attend class, to solve assigned homework problems, and to complete unit exams and a final exam. Computer assignments are required.
  2. Tentative texts and course materials:
* Linear Algebra with Applications, by W. Keith Nicholson, McGraw Hill (2006), ISBN 978-0070922778;
* Linear Algebra with Applications, Seventh Edition, by Gareth Williams, Jones & Bartlett Publishers (2009), ISBN 978-0763782481;
* Introductory Linear Algebra: An Applied First Course (8th Edition), by Bernard Kolman, David R. Hill, Prentice Hall (2004), ISBN 978-0131437401;
* Linear Algebra with Mathematica: An Introduction Using Mathematica, by Fred Szabo, Academic Press (2009), ISBN 978-0123814012.
* Numerical Linear Algebra for Applications in Statistics, by James Gentle, Springer (2008), ISBN 978-03879 85428

**4. Resources:**

* 1. Library resources: See attached library resources form
  2. Computer resources: None

**5. Budget implications:**

* 1. Proposed method of staffing: Existing faculty
  2. Special equipment needed: None
  3. Expendable materials needed: None
  4. Laboratory materials needed: None

**6. Proposed term for implementation:** Fall 2012

**7. Dates of prior committee approvals:**

Mathematics and Computer Science Department: \_\_\_October 14, 2011\_\_\_

Ogden College Curriculum Committee \_\_\_November 3, 2011\_\_

Undergraduate Curriculum Committee \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

University Senate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Attachment: Bibliography, Library Resources Form**, **Course Inventory Form**

Proposal Date: October 3, 2011

**Ogden College of Science and Engineering**

**Department of Mathematics and Computer Science**

**Proposal to Revise a Program**

**(Action Item)**

Contact Person: Zhonghang Xia, [zhonghang.xia@wku.edu](mailto:zhonghang.xia@wku.edu), 745-6459

**1. Identification of program:**

* 1. Current program reference number: 629
  2. Current program title: Bachelor of Science in Computer Science
  3. Credit hours: 44 minimum hours in Computer Science

**2. Identification of the proposed program changes:** Establish admission requirements.

**3. Detailed program description:**

|  |  |
| --- | --- |
| **Current Admission Requirements** | **Proposed Admission Requirements** |
| **None** | **Completion of CS 180, CS 181, and CS 280 with grades of C or better.** |

**4. Rationale for the proposed program change:** The proposed course completion requirements will improve the retention rate of computer science majors and ensure that all students entering the program are qualified and capable of studying upper-division computer science courses.

**5. Proposed term for implementation and special provisions:**

The proposed admission requirement will apply to students admitted to WKU in Fall 2012 and after and to all current students who seek to switch majors to computer science. The requirement will not be retroactive to students who are already declared CS majors.

**6. Dates of prior committee approvals:**

|  |  |  |
| --- | --- | --- |
| Math and CSDepartment |  | 10/20/2011 |
| Ogden Curriculum Committee  Undergraduate Curriculum Committee |  | **\_\_\_\_\_**11/03/11**\_\_\_\_\_\_\_** |

University Senate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Attachment: Program Inventory Form**

Proposal Date: 9/20/11

**Ogden College of Science and Engineering**

**Department of Engineering**

**Proposal to Revise A Program**

**(Action Item)**

Contact Person: Shane M. Palmquist, [shane.palmquist@wku.edu](mailto:shane.palmquist@wku.edu), 745-2919

**1. Identification of program:**

* 1. Current program reference number: 534
  2. Current program title: Civil Engineering
  3. Credit hours: 65 or 66

**2. Identification of the proposed program changes:**

Nine (9) credit hours of technical electives are required from the approved list. See

section 3 for the current and the proposed list of technical electives.

* Remove CE 366 Mechanical & Electrical Systems (3 credit hours) from the list of approved technical electives.
* Remove CE 416 Construction Administration (3 credit hours) from the list of approved technical electives.
* Remove CE 466 Contracts & Specifications (3 credit hours) from the list of approved technical electives.
* Add CE 326 Engineering Law (3 credit hours) to the list of approved technical electives.
* Add CE 436 Design/Construction Integration (3 credit hours) to the list of approved technical electives.
* Add CE 441 Masonry Construction Lab (1 credit hour) to the list of approved technical electives.
* Add CE 444 Bridge Engineering (3 credit hours) to the list of approved technical electives.
* Add CE 451 Water & Wastewater Treatment (3 credit hours) to the list of approved technical electives.
* Add CE 462 Hydraulic Engineering Systems (3 credit hours) to the list of approved technical electives.
* Add CE 486 Steel & Concrete Construction (3 credit hours) from the list of approved technical electives.
* Add CM 363 Construction Estimating & Bidding (3 credit hours) to the list of approved technical electives.
* Add CM 400 Construction Administration (3 credit hours) to the list of approved technical electives.
* Add EE 350 Fundamentals of Electrical Engineering (4 credit hours) to the list of approved technical electives.
* Add GEOG 317 Geographic Information Systems (3 credit hours) to the list of approved technical electives.
* Add GEOG 318 GIS for Engineers (3 credit hours) to the list of approved technical electives.

**3. Detailed program description:**

Nine (9) hours of technical electives are required.

|  |  |  |  |
| --- | --- | --- | --- |
| **Current Program Technical Electives** | **Hrs** | **Proposed Program Technical Electives** | **Hrs** |
| CE 300 Floodplain Management | 3 | CE 300 Floodplain Management | 3 |
|  |  | **CE 326 Engineering Law** | **3** |
| CE 360 Estimating Scheduling Bidding | 3 | CE 360 Estimating Scheduling Bidding | 3 |
| CE 361 Estimating Lab | 1 | CE 361 Estimating Lab | 1 |
| **CE 366 Mechanical & Electrical Systems** | 3 |  |  |
| CE 378 Route Surveying | 3 | CE 378 Route Surveying | 3 |
| CE 379 Route Surveying Lab | 1 | CE 379 Route Surveying Lab | 1 |
| CE 380 Boundary Surveying | 3 | CE 380 Boundary Surveying | 3 |
| CE 381 Boundary Surveying Lab | 1 | CE 381 Boundary Surveying Lab | 1 |
| CE 383 Structural Steel Design | 3 | CE 383 Structural Steel Design | 3 |
| **CE 416 Construction Administration** | 3 |  |  |
| CE 426 Advanced Construction Materials | 3 | CE 426 Advanced Construction Materials | 3 |
|  |  | **CE 436 Design/Construction Integration** | **3** |
| CE 440 Masonry Design and Construction | 3 | CE 440 Masonry Design and Construction | 3 |
|  |  | **CE 441 Masonry Construction Lab** | **1** |
|  |  | **CE 444 Bridge Engineering** | **3** |
|  |  | **CE 451 Water & Wastewater Treatment** | **3** |
|  |  | **CE 462 Hydraulic Engineering Systems** | **3** |
| **CE 466 Contracts & Specifications** | 3 |  |  |
| CE 474 Civil Engineering Project | 1-3 | CE 474 Civil Engineering Project | 1-3 |
| **Current Program Technical Electives** | **Hrs** | **Proposed Program Technical Electives** | **Hrs** |
| CE 475 Selected Topics in Civil Eng. | 3 | CE 475 Selected Topics in Civil Eng. | 3 |
| CE 476 Highway Construction | 3 | CE 476 Highway Construction | 3 |
|  |  | **CE 486 Steel & Concrete Construction** | **3** |
| CE 490 UK-CE Selected Topics (Spring) | 3 | CE 490 UK-CE Selected Topics (Spring) | 3 |
| CE 491 UK-CE Selected Topics (Fall) | 3 | CE 491 UK-CE Selected Topics (Fall) | 3 |
| EM 313 Dynamics | 3 | EM 313 Dynamics | 3 |
|  |  | **CM 363 Construction Est. & Bidding** | **3** |
|  |  | **CM 400 Construction Administration** | **3** |
| CM 426 Construction Law | 3 | CM 426 Construction Law | 3 |
|  |  | **EE 350 Fundamentals of Electrical Eng.** | **4** |
|  |  | **GEOG 317 Geographic Info. Systems** | **3** |
|  |  | **GEOG 318 GIS for Engineers** | **3** |

**4. Rationale for the proposed program change:**

* CE 366 Mechanical & Electrical Systems (3 credit hours) is being deleted from the curriculum with this round of curriculum changes.
* CE 416 Construction Administration (3 credit hours) was deleted from the curriculum two years ago.
* CE 466 Contracts and Specifications (3 credit hours) is being deleted from the curriculum with this round of curriculum changes.
* CE 326 Engineering Law (3 credit hours) is an existing engineering course that would be an appropriate technical elective for students in the program.
* CE 436 Design/Construction Integration (3 credit hours) is an existing engineering course that would be an appropriate technical elective for students in the program.
* CE 441 Masonry Construction Lab (1 credit hour) is the lab component for CE 440 Masonry Design and Construction (3 credit hours). The lab should count toward the technical electives credit hour requirement since Boundary Surveying Lab (1 credit hour) and Route Surveying Lab (1 credit hour) count toward this requirement.
* CE 444 Bridge Engineering (3 credit hours) is a new engineering course that would be an appropriate technical elective for students in the program.
* CE 451 Water & Wastewater Treatment (3 credit hours) is an existing engineering course that would be an appropriate technical elective for students in the program.
* CE 462 Hydraulic Engineering Systems (3 credit hours) is an existing engineering course that would be an appropriate technical elective for students in the program.
* CE 486 Steel & Concrete Construction (3 credit hours) is an existing engineering course that would be an appropriate technical elective for students in the program.
* CM 363 Construction Estimating & Bidding (3 credit hours) is an existing civil engineering related course that would be an appropriate technical elective for students in the program.
* CM 400 Construction Administration (3 credit hours) is an existing civil engineering related course that would be an appropriate technical elective for students in the program.
* EE 350 Fundamentals of Electrical Engineering (4 credit hours) is an existing engineering related course that would be an appropriate technical elective for students in the program.
* GEOG 317 Geographic Information Systems (3 credit hours) is an existing civil engineering related course that would be an appropriate technical elective for students in the program.
* GEOG 318 GIS for Engineers (3 credit hours) is an existing civil engineering related course that would be an appropriate technical elective for students in the program.

**5. Proposed term for implementation:** Fall 2012

**6. Dates of prior committee approvals:**

Department of Engineering \_\_\_\_\_10/18/2011\_\_\_\_\_

Ogden College Curriculum Committee \_\_\_\_\_11/03/2011\_\_\_\_\_

Undergraduate Curriculum Committee \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

University Senate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Attachment: Program Inventory Form**