MEMORANDUM TO: Ogden College of Science and Engineering Curriculum Committee

Dr. Jack Rudolph	Dr. James Gary	Dr. Greg Arbuckle
Dr. Martin Stone	Dr. Rong Yang	Dr. John Khouryieh
Dr. Bruce Schulte	Dr. Julie Ellis	Dr. Bruce Kessler
Dr. Phil Lienesch	Dr. Warren Campbell	Dr. Richard Schugart
Dr. Cathleen Webb	Dr. David Keeling	Dr. Keith Andrew
Dr. Hemali Rathnayake	Dr. Xingang Fan	
Dr. Les Pesterfield		

FROM: Kenneth Crawford, Chair

SUBJECT: Agenda for <u>Thursday, November 7, 2013</u>, 4:00 p.m. in COHH 4123

A. OLD BUSINESS:

I. Consideration of the minutes of the October 10, 2013 meeting.

B. NEW BUSINESS:

<u>Information Items</u>

<u>Department of Engineering</u>

I. Proposal to Create a Temporary Course
   a. EE 436, Electric Machines and Drives, 3 hrs.

<u>Consent Items</u>

<u>Department of Mathematics</u>

I. Proposal to Revise a Course Catalog Listing
   a. Math 417, Algebraic Systems, 3 hrs.

<u>Action Items</u>

<u>Department of Architectural and Manufacturing Sciences</u>

I. Proposal to Revise a Program
   a. Ref. #575, Technology Management, 63 hrs.

<u>Department of Engineering</u>

I. Proposal to Create a New Course
   a. CE 305, Risk Analysis, 3 hrs.

II. Proposal to Revise a Program
   a. Ref. #537, Electrical Engineering, 57 hrs.

III. Proposal to Revise Course Credit Hours
   a. EE 180, Digital Circuits, 4 hrs.

b. EE 200, Electrical Engineering Design II, 1 hr.
c. EE 431, Introduction to Power Systems, 3 hrs.
d. EE 460, Continuous Control Systems, 4 hrs.

C. **OTHER BUSINESS**

Minutes – OCSE Curriculum Committee **October 10, 2013**

MEMBERS PRESENT:

Dr. Martin Stone	Dr. Warren Campbell
Dr. Phil Linesch	Dr. Xingang Fan
Dr. Hemali Rathnayake	Dr. Greg Arbuckle
Dr. Martha Day for Dr. Les Pesterfied	Dr. John Khouryieh
Dr. James Gary	Dr. Rong Yang
Dr. Julie Ellis	Dr. Richard Schugart
Dr. Keith Andrew	Dr. Robert Choate, Guest

FROM: Ken Crawford, Chair

OLD BUSINESS:
Ellis/Campbell moved approval of the minutes from the September 5, 2013 meeting. Motion passed.

NEW BUSINESS:

Consent Agenda
All consent items were passed as presented on a Ellis/Campbell motion.

Action Agenda

Department of Engineering
Ellis/Campbell moved approval of the proposal to create a new course, ENGR 400, Principles of Systems Engineering. Motion passed.

Arbuckle/Campbell moved approval of the proposal to create a new minor program, Minor in Systems Engineering. Motion passed with friendly amendment to correct grammar error in part three of the proposal.

SKyTeach
Martin/Campbell moved approval of the proposal to revise a program, Ref. #734, Middle School Science Education. Motion passed with friendly amendment to change BIO to BIOL.

OTHER BUSINESS:

No other business. Meeting was adjourned at 4:17 p.m.

Proposal Date: Oct. 10, 2013

Ogden College of Science and Engineering
Department of Engineering
Proposal to Create a Temporary Course
Information Item

Contact Person: Dr. Farhad Ashrafzadeh, Email: Farhad.Ashrafzadeh@wku.edu, phone: 270-745-5877

1. Identification of proposed course:
   1.1 Course prefix (subject area) and number: EE 436
   1.2 Course title: Electric Machines and Drives
   1.3 Abbreviated course title: Electric Machines and Drives
   1.4 Credit hours: 3
   1.5 Schedule type: L (lecture)
   1.6 Prerequisites: EE 211 and EE 473
   1.7 Grade type: _X_ standard letter grade ____ pass/fail ____in progress (IP)
   1.8 Course description:
   Introduction to principles and contemporary applications of electric machines and drive systems as they pertain to electric vehicles, wind turbines, residential appliances, etc. Topics include basic electromechanical energy conversion, switch mode power converters, DC and AC machines, and speed control of both DC and AC motor drives. No laboratory is included.

2. Rationale
   2.1 Reason for offering this course on a temporary basis:
   Electric machines account for 60% of total energy consumption at the national level, and electric drives are widely used in renewable energy and electric vehicles. Knowledge of these topics is critical to workforce development. We would like to see if the course is appealing to students, faculty, and industrial partners. If well received, we may propose its implementation, as an elective, on an ongoing and sustainable basis.
   2.2 Relationship of the proposed course to courses offered in other academic units:
   No similar course is being offered in other academic units.

3. Description of proposed course
   3.1 Course content outline
   - Introduction to electrical motor drives
   - Mechanical system requirement of electrical drives
   - Basics of three-phase electric circuits
   - Switched mode power converters for motor drives
   - Basics of magnetic circuits
   - Principles of electromechanical energy conversion
   - Designing feedback controllers for motor drives
   - DC motor drives
   - AC induction motor drives – speed control

   3.2 Tentative text(s):
   - "Electric Machines and Drives: A First Course," By: Ned Mohan

- "Electrical Machines, Drives, and Power Systems" By: Theodore Wildi

4. Second offering of a temporary course (if applicable)

4.1 Reason for offering this course a second time on a temporary basis: N/A

4.2 Term course was first offered: N/A

4.3 Enrollment in first offering: N/A

5. Term of Implementation: Spring 2014

6. Dates of review/approvals:

Department of Engineering Oct. 17, 2013

Dean, Ogden College of Science and Engineering _____

Ogden College
Department of Mathematics
Proposal to Revise Course Catalog Listing
(Consent Item)

Contact Person: Dominic Lanphier, 56233, dominic.lanphier@wku.edu

7. Identification of course:

1.1 Course prefix (subject area) and number: Math 417

1.2 Course title: Algebraic Systems

8. Current course catalog listing:

Theory of groups

9. Proposed course catalog listing:

The theory of finite groups and related algebraic systems. Lagrange's Theorem, Sylow Theorems, and the structure of finite groups are studied. Applications of group theory to the study of algebraic problems and symmetry.

10. Rationale for revision of the course catalog listing:

The old listing lacks sufficient detail and is inflexible in that subjects other than group theory may be covered. The new listing is more accurate for a senior and first-year graduate-level algebra course and allows for a more flexible list of topics to be covered.

11. Proposed term for implementation:

Fall 2014

12. Dates of prior committee approvals:

Department of Mathematics	10/18/2013
Ogden College Curriculum Committee	
Professional Education Council (if applicable)	
Undergraduate Curriculum Committee	
University Senate	
Provost	

Proposal Date: September 6, 2013

Ogden College of Science and Engineering
Department of Architectural and Manufacturing Sciences
Proposal to Revise a Program
(Action Item)

Contact Person: Dr. Daniel Jackson (dan.jackson@wku.edu) 745-5955

1. Identification of program:

1.3 Program reference number: 575
1.4 Program title: Technology Management
1.5 Credit hours: 63

2. Identification of the proposed program changes:

Changes to Advanced Manufacturing Major

- Management Core – Remove ENG 307
- Management Core - Add the requirement of AMS 396: Supply Chain Management

3. Detailed program description:

Technology Management (old)	63 hours	Technology Management (new)	63 hours
Management Core:		Management Core:	
AMS 271: Industrial Statistics	3	AMS 271: Industrial Statistics	3
AMS 310: Work Design Ergonomics	3	AMS 310: Work Design Ergonomics	3
AMS 356: Systems Design and Operations	3	AMS 356: Systems Design and Operations	3
AMS 371: Quality Assurance	3	AMS 371: Quality Assurance	3
AMS 390: Project Management	3	AMS 390: Project Management	3
AMS 394: Lean Manufacturing	3	AMS 394: Lean Manufacturing	3
AMS 430: Tech Mgmt/Supervision/Team Bldg	3	AMS 430: Tech Mgmt/Supervision/Team Bldg	3
AMS 490: Senior Research	3	AMS 490: Senior Research	3
ENG 307: Technical Writing	**3**	**AMS 396: Supply Chain Management**	**3**
Advisor Approved Upper Division Electives	12	Advisor Approved Upper Division Electives	12
Technical Core Transfer	24	Technical Core Transfer	24

4. Rationale for the proposed program change:

Changes to Technology Management Major

- Management Core – Remove ENG 307– writing across all levels of coursework has been initiated in the Technology Management coursework. This includes sessions on resume writing and technical memos.

- Management Core - Add the requirement of AMS 396: Supply Chain Management – This course links together aspects of manufacturing from acquiring raw materials and resources through production and delivery of a product. In recent years it has become a critical area of Technology Management.

5. Effective Catalog Year: 2014-2015

6. Dates of prior committee approvals:

Architectural and Manufacturing Sciences Department: 09/09/2013

OCSE Curriculum Committee _____

Undergraduate Curriculum Committee _____

University Senate _____

Proposal Date: August 20, 2013

Ogden College
Department of Engineering
Proposal to Create a New Course
(Action Item)

Contact Person: Warren Campbell, 5-8988, warren.campbell@wku.edu

1. Identification of proposed course:

1.6 Course prefix (subject area) and number: CE 305
1.7 Course title: Risk Analysis
1.8 Abbreviated course title: Risk Analysis
1.9 Credit hours and contact hours: 3
1.10 Type of course: L
1.11 Prerequisites: MATH 137
1.12 Course catalog listing:
Uncertainty and methods for risk analysis for engineering systems including engineering economics, probabilistic and statistical methods, and Monte Carlo simulation with applications to civil, electrical, and mechanical engineering.

2. Rationale:

2.3 Reason for developing the proposed course: Creation of this course better prepares engineering students for the Fundamentals of Engineering (FE) Exam, the first step toward licensure. Success rate on the FE Exam is an assessment measure we use for accreditation documents. The course will also better prepare engineers for their careers by introducing a basic element of engineering practice: uncertainty, introducing the time value of money critical to financing any engineering project, and introducing optimization to improve engineering designs.
2.4 Projected enrollment in the proposed course: 25 per year
2.5 Relationship of the proposed course to courses now offered by the department: No relationship.
2.6 Relationship of the proposed course to courses offered in other departments: It contains elements of STAT 301 and MATH 405.
2.7 Relationship of the proposed course to courses offered in other institutions: A similar course is taught at the University of Southern California, Colorado State, the University of Alabama, MIT (graduate level), University of Maryland, and the Swiss Federal Institute of Technology.

3. Discussion of proposed course:

The course introduces basic tools in probability, statistics, and economic concepts that are applicable to the analysis of complex systems.

3.1 Course objectives: Engineers often confront problems that involve complex systems with uncertain and variable inputs. Upon completion of this course, students will understand the concept of the time value of money and how to use numerical modeling to make forecasts for unobserved conditions and determine strategies that might improve the behavior of the system. In addition they will know how to use probability and statistics as valuable tools to characterize uncertainty and its implications in terms of risk and failure for engineering projects.
3.2 Content outline:

- Time value of money
- Optimization of engineering systems
- Basic computer programming and spreadsheet analysis with applications to civil engineering, electrical engineering, and mechanical engineering systems.
- Solution of engineering equations
- Probability distributions with engineering applications (binomial, Poisson, extreme value, log Pearson type III and others)
- Statistical hypothesis testing for engineering practice
- Uncertainty of variables and propagation through equations
- Sampling theory and Monte Carlo simulation

3.3 Student expectations and requirements: Students will be evaluated using the following assessment tools: homework; exams including a final; and/or computer projects.

3.4 Tentative texts and course materials:
An Introduction to Error Analysis: The Study of Uncertainties in Physical Measurements 2nd Edition by John R. Taylor (1997), and instructor notes and supplementary materials.

4. Resources:

4.1 Library resources: None required

4.2 Computer resources: Computer lab (25 seats) with Microsoft Office suite

5. Budget implications:

5.1 Proposed method of staffing: Existing faculty will teach the course.

5.2 Special equipment needed: None

5.3 Expendable materials needed: Computer paper and printer ink.

5.4 Laboratory materials needed: Computers

6. Proposed term for implementation: Fall 2014

7. Dates of prior committee approvals:

Engineering Department/Division: _10/17/2013_____

Ogden College Curriculum Committee _____

Undergraduate Curriculum Committee _____

University Senate _____

Attachment: Course Inventory Form

Proposal Date: 10/1/2013

Ogden College of Science and Engineering
Department of Engineering
Proposal to Revise a Program
(Action Item)

Contact Person: Mark Cambron email: mark.cambron@wku.edu phone: 5-8868

1. Identification of program

1.1 Reference Number: 537
1.2 Current Program Title: Electrical Engineering
1.3 Credit Hours: 57

2. Identification of the proposed program changes:

- Remove ENGR 175, EE 175, UC 175 as a required course.
- Modify the numbers of credit-hours to reflect changes in EE 180, EE 200, EE 341, and EE 460.
- Change EE 405, EE 450, EE 451, EE 470, EE 475, and EE 479 from required courses to electives.
- Change the number of required EE Elective credit-hours from 6 to 12.
- Add MATH 370 to list of math electives.
- Add ENGR 400 to the listed of accepted Engineering/Science Electives.
- Decrease the number of credit-hours in program from 62 to 57.

3. Detailed program description:

Current Program			**Proposed Program**		
ENGR 175	University Experience*, and	1	~~ENGR 175~~	~~University Experience*, and~~	
EE 101	Design I	1	EE 101	Design I	1
	or			~~or~~	
EE175	University Experience - EE	2	~~EE175~~	~~University Experience - EE~~	~~2~~
	or			~~or~~	
UC 175	University Experience*,and	2	~~UC 175~~	~~University Experience*,and~~	~~2~~
EE 101	Design I	1	~~EE 101~~	~~Design I~~	~~1~~
EE180	Digital Circuits	4	**EE180**	**Digital Circuits**	**3**
EE200	Design II	1	**EE200**	**Design II**	**2**
EE210	Circuits & Networks I	3.5	EE210	Circuits & Networks I	3.5
EE211	Circuits & Networks II	3.5	EE211	Circuits & Networks II	3.5
EE300	Design III	1	EE300	Design III	1
EE345	Electronics	4	EE345	Electronics	4
EE380	Microprocessors	4	EE380	Microprocessors	4
EE400	Design IV	1	EE400	Design IV	1

EE401 Senior Design 3	EE401 Senior Design 3
EE405 EE Senior Research Seminar 1	~~EE405 EE Senior Research Seminar 0~~
EE420 Signals & Linear Systems 3	EE420 Signals & Linear Systems 3
EE431 Intro. to Power Systems 3	**EE431 Intro. to Power Systems 3.5**
EE450 Digital Signal Proc. 3	~~EE450 Digital Signal Proc. 3~~
EE451 Digital Signal Proc. Lab 1	~~EE451 Digital Signal Proc. Lab 1~~
EE460 Cont. Control Systems 4	**EE460 Cont. Control Systems 3.5**
EE470 Communications 3	~~EE470 Communications 3~~
EE473 EM Fields & Waves 3	EE473 EM Fields & Waves 3
or	**or**
PHYS 440 Electricity and Magnetism 3	PHYS 440 Electricity and Magnetism 3
EE475 Communications Lab 1	~~EE475 Communications Lab 1~~
EE479 Fund. Of Optoelectronics 2	~~EE479 Fund. Of Optoelectronics 2~~
EE Technical Electives 6	**EE Technical Electives 12**
Engineering/Science Electives 6	Engineering/Science Electives 6
Tech. Course Total: 62	**Tech. Course Total: 57**
Other Requirements	**Other Requirements**
MATH136 Calculus I 4	MATH136 Calculus I 4
MATH137 Calculus II 4	MATH137 Calculus II 4
MATH237 Multivariable Calculus 4	MATH237 Multivariable Calculus 4
MATH331 Differential Equations 3	MATH331 Differential Equations 3
MATH350 Advanced Engr. Math 3	~~MATH350 Advanced Engr. Math 3~~
or	~~or~~
MATH307 Intro. Linear Algebra 3	~~MATH307 Intro. Linear Algebra 3~~
	~~**or**~~
	Math Elective 3
STAT301 Probability & Statistics 3	STAT301 Probability & Statistics 3
PHYS255 University Physics I 4	PHYS255 University Physics I 4
PHYS256 University Physics I Lab 1	PHYS256 University Physics I Lab 1
PHYS265 University Physics II 4	PHYS265 University Physics II 4
Science Elective 3	Science Elective 3
CS239 Prob Solving Comp Tech 3	CS239 Prob Solving Comp Tech 3
ECON ECON 202 or ECON 203 3	ECON ECON 202 or ECON 203 3
Other Hours: 39	**Other Hours: 39**

Engineering/Science Electives (take at least 6 hours)
EM 221 or EM 222 or PHYS 350
ME 365 or ME 220 or PHYS 330
ME 240 Materials and Methods of Manufacturing
ME 330 or CE 341 or CE 342
PHYS 450 Classical Mechanics II
PHYS 318 Data Acquisition Using Labview
ENGR 400 Principles of Systems Engineering

EE Elective (take at least 12 hours)
EE 405 EE Senior Research Seminar
EE 410/411 Computer Design
EE 432 Power Systems II
EE 443 Microfabrication and Mems
EE 445 Advanced Electronics
EE 450/451 Digital Signal Processing
EE 461 Discrete Control Sys
EE 462 Special Topics in Control
EE 470/475 Communications
EE 477 Num Tech.
EE 479 Fund. Of Optoelectronics
EE 480 Embedded Systems
EE 490 Robotics

Math Elective (take at least 3 hours)
MATH 307 Linear Algebra
MATH 350 Advanced Engineering Math
MATH 370 Applied Techniques in Math

Science Electives (take at least 3 hours)
CHEM 116 Intro to College Chemistry
CHEM 120 College Chemistry I
BIOL 120 Biological Concepts
ENV 280 Intro to Environmental Science
GEOL 111 The Earth

4. Rationale for the proposed program change:

Remove ENGR 175, EE 175, UC 175 as a required course

Currently students are allowed to take a combination of EE Design I and a University Experience. All transfer students have been exempt from University Experience. In order to lower program hours, EE students will not be required to take a University Experience course. Students that begin the program at a lower math level will continue to be advised to take UC 175 or ENGR 175.

Modify the numbers of credit-hours to reflect changes in EE 180, EE 200, EE 341, and EE 460

The numbers of credit-hours for these courses has been changed recently, and these changes now appear in the program.

Change EE 405, EE 450, EE 451, EE 470, EE 475, and EE 479 from required courses to electives.
The Electrical Engineering Program reviewed the curriculum of several other electrical programs. The course work in EE 405 (EE Research Seminar) , EE 450/451 (Digital Signal Processing), EE 470/475 (Communications), EE 479 (Fundamentals of Optoelectronics) are all common electives in engineering programs. Moving these courses into the list of electives will increase the students' ability to select courses of interest to them.

Change the number of required EE Elective credit-hours from 6 to 12
Because several required engineering courses will become electives, students will be required to take at least 12 credit-hours of electives. This new arrangement will allow courses to be taught in alternate years, increase students' options and lower the total number of hours required in the program.

Add MATH 370 to list of math electives
For several semesters the Math Department has taught MATH 370 (Applied Techniques in Mathematics). MATH 370 covers applications that include linear algebra. The EE faculty believe that electrical engineering students will benefit from the flexibility of taking MATH 307 or MATH 370. MATH 350 is currently not being offered but was a wonderful course that is still on the books.

Add ENGR 400 to the listed of accepted Engineering /Science Electives
EE Faculty believe that students will benefit from having ENGR 400 Systems Engineering on the list of acceptable Engineering /Science Electives.

Decrease the number of credit-hours in program from 62 to 57
The changes outlined above will reduce the program requirements by 5 hours. WKU is encouraging academic units to decrease the number of credit-hours in their major programs.

5. Proposed term for implementation and special provisions: Fall 2014

6. Dates of prior committee approvals:

Department of Engineering	31 Oct 2013
Ogden College Curriculum Committee	
Undergraduate Curriculum Committee	
University Senate	

Attachment: Program Inventory Form

Proposal Date: October 30, 2013

Ogden College of Science and Engineering
Department of Engineering
Proposal to Revise Course Credit Hours
(Action Item)

Contact Person: Stacy Wilson, stacy.wilson@wku.edu, 745-5848

1. Identification of course:

1.13 Current course prefix (subject area) and number: EE 180
1.14 Course title: Digital Circuits
1.15 Credit hours: 4

2. Proposed course credit hours: 3.0

3. Rationale for the revision of course credit hours:

Currently, EE 180 is a four-credit-hour course, with three hours per week for lecture and two hours per week for laboratory. In addition, the co-requisite for the course is MATH 117. To lessen the significant load this course places on students and faculty, the lab component will be removed from EE 180, and the skills that students currently learn in the laboratory will be moved into other courses where appropriate.

4. Proposed term for implementation: Fall 2014

5. Dates of prior committee approvals:

Engineering Department: _____

OSCE Curriculum Committee _____

Undergraduate Curriculum Committee _____

University Senate _____

Attachment: Course Inventory Form

Proposal Date: October 30, 2013

Ogden College of Science and Engineering
Department of Engineering
Proposal to Revise Course Credit Hours
(Action Item)

Contact Person: Farhad Ashrafzadeh, Farhad.Ashrafzadeh@wku.edu, 745-5877

1. **Identification of course:**
   1.16 Current course prefix (subject area) and number: EE 200
   1.17 Course title: Electrical Engineering Design II
   1.18 Credit hours: 1

2. **Proposed course credit hours:** 2

3. **Rationale for the revision of course credit hours:**
   Currently, EE 200 is a 1.0 credit hour course that covers Matlab software and a circuit design project. The circuit breadboarding skills presented in EE 180 will be moved to EE200 to achieve greater synergy between circuit design, prototyping, and fabrication. The additional 1.0 hour will also allow the expansion of the Matlab component.

4. **Proposed term for implementation:** Fall 2014

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

Department of Engineering	**31 Oct 2013**
OSCE College Curriculum Committee	
Undergraduate Curriculum Committee	
University Senate	

Attachment: Course Inventory Form

Proposal Date: October 30, 2013

Ogden College of Science and Engineering
Department of Engineering
Proposal to Revise Course Credit Hours
(Action Item)

Contact Person: Walter Collett, walter.collett@wku.edu, 745-2016

1. Identification of course:

1.19 Current course prefix (subject area) and number: EE 431
1.20 Course title: Introduction to Power Systems
1.21 Credit hours: 3

2. Proposed course credit hours: 3.5

3. Rationale for the revision of course credit hours:

Currently, this course is a 3.0 credit hour course with 2.5 hours allocated to lecture, and the remaining 0.5 hour to lab (lab meeting two hours per week for approximately 0.5 the semester). The faculty desire to increase the lecture component of the course to 3.0 full hours while maintaining the 0.5 hour allocation to the lab component. This will allow greater time for examining important course topics while not reducing the amount of time spent in the lab.

4. Proposed term for implementation: Fall 2014

5. Dates of prior committee approvals:

Engineering Department: 31 Oct 2013

OSCE Curriculum Committee _____

Undergraduate Curriculum Committee _____

University Senate _____

Attachment: Course Inventory Form

Proposal Date: October 30, 2013

Ogden College of Science and Engineering
Department of Engineering
Proposal to Revise Course Credit Hours
(Action Item)

Contact Person: Stacy Wilson, stacy.wilson@wku.edu, 745-5848

1. Identification of course:

1.22 Current course prefix (subject area) and number: EE 460
1.23 Course title: Continuous Control Systems
1.24 Credit hours: 4.0

2. Proposed course credit hours: 3.5

3. Rationale for the revision of course credit hours:

Currently, EE 460 is a 4.0 credit-hour course with 3.0 credit-hours dedicated to lecture and 1.0 credit-hour for a laboratory experience. This course has been taught in this format for several years and it has become apparent that a 1.0 hour laboratory experience is not necessary. There is little hardware available for in-lab experiences and the students have been performing simulations as part of the normal lecture component work. Therefore, the faculty proposes to decrease the lab portion of the course to 0.5 credit-hours, thereby reducing the number of credit-hours for the course to 3.5.

4. Proposed term for implementation: Fall 2014

5. Dates of prior committee approvals:

Engineering Department: 31 Oct 2013

OSCE Curriculum Committee _____

Undergraduate Curriculum Committee _____

University Senate _____

Attachment: Course Inventory Form