CHANGE UNDERGRADUATE PROGRAM FORM

1. General Information

College:	Engineering	Department:	Computer Science
Current Major Name:	Computer Science	*Proposed Major Name:*	*Computer Science*
Current Degree Title:	Bachelor of Science in Computer Science	*Proposed Degree Title:*	*Bachelor of Science in Computer Science*
Formal Option(s):	N/A	*Proposed Formal Option(s):*	*N/A*
Specialty Field w/in Formal Option:	N/A	*Proposed Specialty Field w/in Formal Options:*	*N/A*

Date of Contact with Associate Provost for Academic Administration[1]:	09/01/15				
Bulletin (yr & pgs):	2015-2016, pp. 246-247	CIP Code[1]:	11.0101	Today's Date:	09/23/2015
Accrediting Agency (if applicable):	ABET				
Requested Effective Date:	☒ Semester following approval.	OR	☐ Specific Date[2]:		
Dept. Contact Person:	Jerzy W. Jaromczyk	Phone:	257-1186	Email:	jurek@cs.uky.edu

2. General Education Curriculum for this Program:

The new General Education curriculum is comprised of the equivalent of 30 credit hours of course work. There are, however, some courses that exceed 3 credits & this would result in more than 30 credits in some majors.

- There is no foreign language requirement for the new Gen Ed curriculum.
- There is no General Education Electives requirement.

Please list the courses/credit hours currently used to fulfill the University Studies/General Education curriculum:
Intellectual Inquiry in Arts and Creativity: Choose one course from the approved list (3)
Intellectual Inquiry in the Humanities: Choose one course from the approved list (3)
Intellectual Inquiry in the Social Sciences: Choose one course from the approved list (3)
Intellectual Inquiry in the Natural, Physical, and Mathematical Sciences: PHY 231 (4) and PHY 241 (1)
Composition and Communication I: CIS/WRD 110 (3)
Composition and Communication II: CIS/WRD 111 (3)
Quantitative Foundations: MA 113 Calculus I (4)
Statistical Inferental Reasoning: Choose one course from the approved list (3)
Community, Culture and Citizenship: Choose one course from approved list (3)
Global Dynamics: Choose one course from approved list (3)

Please identify below the suggested courses/credit hours to fulfill the General Education curriculum.

	General Education Area		Course	Credit Hrs
I. Intellectual Inquiry (one course in each area)				
	Arts and Creativity		*Choose from list*	*3*
	Humanities		*Choose from list*	*3*

[1] Prior to filling out this form, you MUST contact the Associate Provost for Academic Administration (APAA). If you do not know the CIP code, the (APAA) can provide you with that during the contact.

[2] Program changes are typically made effective for the semester following approval. No program will be made effective until all approvals are received.

	Social Sciences		*Choose from list*	*3*
	Natural/Physical/Mathematical		*PHY 231 & 241*	*5*
II. Composition and Communication				
	Composition and Communication I		CIS or WRD 110	3
	Composition and Communication II		CIS or WRD 111	3
III. Quantitative Reasoning (one course in each area)				
	Quantitative Foundations[3]		*MA 113*	*4*
	Statistical Inferential Reasoning		*STA 381*	*3*
IV. Citizenship (one course in each area)				
	Community, Culture and Citizenship in the USA		*Choose from list*	*3*
	Global Dynamics		*Choose from list*	*3*
			Total General Education Hours	*33*

3. Explain whether the proposed changes to the program (as described in sections 4 to 12) involve courses offered by another department/program. Routing Signature Log must include approval by faculty of additional department(s).

The proposed curricular change includes the addition of EGR 101, 102 and 103 as a part of the Common Year, the replacement of STA 281 with STA 381, the addition of MA 322 as an option to CS/MA 321, and the elimination of CS 115, PHY 232/242 and CS/EE 380 from the list of current requirements as a result of adding new courses.

4. Explain how satisfaction of the University Graduation Writing Requirement will be changed.

Current		*Proposed*	
☐ Standard University course offering. List: _____		☐ *Standard University course offering. List: _____*	
☒ Specific course – list:	CS 499 Senior Design	☒ *Specific course) – list:*	*CS 499 Senior Design*

5. List any changes to college-level requirements that must be satisfied.

Current		*Proposed*	
☐ Standard college requirement. List: _____		☐ *Standard college requirement. List: _____*	
☐ Specific required course – list:	_____	☐ *Specific course – list:*	_____

6. List pre-major or pre-professional course requirements that will change, including credit hours.

Current	*Proposed*
CS 100 (1)	*CIS/WRD 110 (3)*
CS 115 (3)	*CIS/WRD111 (3)*
CS 215 (4)	*CHE 105 (4)*
CS 216 (3)	*MA 113 (4)*
CS 275 (4)	*MA 114 (4)*
CIS/WRD 110 (3)	*PHY 231 (4)*

[3] Note that MA 109 is NOT approved as a Quantitative Foundations course. Students in a major requiring calculus will use a calculus course (MA 113, 123, 137 or 138) while students not requiring calculus should take MA 111, PHI 120 or another approved course.

MA 113 (4) MA 114 (4) PHY 231 (4) PHY 241 (1) Subtotal: Premajor hours 31	*PHY 241 (1)* *EGR 101 (1)* *EGR 102 (2)* *EGR 103 (2)* *CS 215 (4)* *CS 216 (3)* *CS 275 (4)* *UK Core (3)* *MA 213 (4)* *EE 280 (3)* *Subtotal: Premajor hours..... 39*

7. List the major's course requirements that will change, including credit hours.

Current	*Proposed*
PHY 232 (4) PHY 242 (1) Additional Science Electives (6) MA 213 (4) EE 280 (3) STA 281 (3) CS 315 (3) CS/MA 321 (3) CS 375 (3) CS/EE 380 (3) CS 470G (3) CS 499 (3) Subtotal: Major hours ..... (39) Computer Science Electives (9)) Choose three from the following list: CS 335 (3) CS 405G (3) CS 441G (3) CS 450G (3) CS 463G (3) Any other CS class at the 300-level or above (3) Subtotal: CS Electives (9) Technical Electives Choose 12 credit hours of the following: MA 214 Calculus IV or any 300-level or higher classes selected from computer science, electrical engineering, mathematics, or the College or Business and Economics Subtotal: Technical Electives (12) Electives (Non-Technical and Free Electives) Two courses must be in areas other than computer science, science, engineering, or mathematics. Any remaining electives should be selected to meet the minimum total of 128 hours required for graduation Subtotal: Electives (minimum of 6) TOTAL HOURS 128	*CS 270 (3)* *STA 381 (3)* *Additional Science Electives (6)* *CS 315 (3)* *CS/MA 321 (3);* *or MA 322 (3)* *CS 371 (3)* *CS 375 (3)* *CS 498G (3)* *CS 499 (3)* *Subtotal: Major hours ..... (30)* *Computer Science Electives (15)* *Choose five CS classes at the 300-level or above with at least three from the following list:* *CS 335 (3)* *CS 378 (3)* *CS 405G (3)* *CS 441G (3)* *CS 450G (3)* *CS 460G (3)* *CS 463G (3)* *Subtotal: CS Electives (15)* *Technical Electives* *Choose 12 credit hours of the following:* *MA 214 Calculus IV or any 300-level or higher classes selected from computer science, electrical engineering, mathematics, the College or Business and Economics, or by advisor's approval* *Subtotal: Technical Electives (12)* *Electives (Non-Technical and Free Electives)* *At least one course must be in areas other than computer science, science, engineering, or mathematics. Any remaining electives should be selected to meet the minimum total of 128 hours required for graduation* *Subtotal: Electives (minimum of 10)* *TOTAL HOURS 128*

CHANGE UNDERGRADUATE PROGRAM FORM

8. Does the pgm require a minor AND does the proposed change affect the required minor? ☐ N/A ☐ Yes ☒ No

If "Yes," indicate current courses and proposed changes below.

Current	*Proposed*
____	____

9. Does the proposed change affect any option(s)? ☐ N/A ☐ Yes ☒ No

If "Yes," indicate current courses and proposed changes below, including credit hours, and also specialties and subspecialties, if any.

Current	*Proposed*
____	____

10. Does the change affect pgm requirements for number of credit hrs outside the major subject in a related field? ☐ Yes ☒ No

If so, indicate current courses and proposed changes below.

Current	*Proposed*
____	

11. Does the change affect pgm requirements for technical or professional support electives? ☒ Yes ☐ No

If so, indicate current courses and proposed changes below.

Current	*Proposed*
CS Electives (9), Technical Electives (12)	*CS Electives (15), Technical Electives (12)*

12. Does the change affect a minimum number of free credit hours or support electives? ☒ Yes ☐ No

If "Yes," indicate current courses and proposed changes below.

Current	*Proposed*
Electives (Non-Technical and Free Electives) (6)	*Electives (Non-Technical and Free Electives) (10)*

13. Summary of changes in required credit hours:

		Current	*Proposed*
a. Credit Hours of Premajor or Preprofessional Courses:		31	*39*
b. Credit Hours of Major's Requirements:		39	*30*
c. Credit Hours for Required Minor:		N/A	*N/A*
d. Credit Hours Needed for a Specific Option:		N/A	*N/A*
e. Credit Hours Outside of Major Subject in Related Field:		N/A	*N/A*
f. Credit Hours in Technical or Professional Support Electives:		21	*27*
g. Minimum Credit Hours of Free/Supportive Electives:		6	*10*
h. Total Credit Hours Required by Level:	100:	21	*23*
	200:	24	*26*
	300:	12	*12+electives*
	400-500:	6	*6+electives*
i. Total Credit Hours Required for Graduation:		128	*128 (including*

		Electives, and UK Core)

14. Rationale for Change(s) – if rationale involves accreditation requirements, please include specific references to that.

The Department of Computer Science is revising its undergraduate program to incorporate the college's new first-year student common experience. The proposed curricular changes include the addition of EGR 101, 102 and 103, change from STA 281 to STA 381, the addition of MA 322 as an option to CS/MA 321, and the elimination of PHY 232/242 and CS/EE 380. The curriculum is restructured to include new Computer Science courses that reflect new trends and needs of CS graduates. In particular, the number of Computer Science Electives is increased from 9 to 15 credit hours to accomodate the growing breadth and depth in CS areas. The total number of credit hours will remain the same as with the current program. The new courses CS 270, CS 371, CS 498 have been already approved by the Undergraduate Council.

15. List below the typical semester by semester program for the major. If multiple options are available, attach a separate sheet for each option.

YEAR 1 – FALL: **(e.g. "BIO 103; 3 credits")**	CIS/WRD 110 (3) EGR 101 (1) EGR 102 (2) MA 113 (4) CHE 105 (4)	**YEAR 1 – SPRING:**	*CIS/WRD 111 (3)* *EGR 103 (2)* *PHY 231 (4)* *PHY 241 (1)* *CS 215 (4)* *MA 114 (4)*
YEAR 2 - FALL :	CS 216 (3) CS 275 (4) EE 280 (3) MA 213 (4) UK Core (3)	**YEAR 2 – SPRING:**	*CS 270 (3)* *CS 315 (3)* *Technical Elective (3)* *UK Core (3)* *Science Elective (3)*
YEAR 3 - FALL:	CS/MA 321 or MA 322 (3) CS 371 (3) CS Elective (3) CS Elective (3) STA 381 (3)	**YEAR 3 - SPRING:**	*CS 375 (3)* *CS Elective (3)* *CS Elective (3)* *Technical Elective (3)* *UK Core (3)* *Natural Science Elective (3)*
YEAR 4 - FALL:	CS 498G (3) CS Elective (3) Technical Elective (3) UK Core (3) Free Elective (4)	**YEAR 4 - SPRING:**	*CS 499 (3)* *CS Elective (3)* *Non-Technical Elective (3)* *Technical Elective (3)* *Free Elective (3)*

CHANGE UNDERGRADUATE PROGRAM FORM

Signature Routing Log

General Information:

Current Degree Title and Major Name: Bachelor of Science in Computer Science

Proposal Contact Person Name: Jerzy W. Jaromczyk Phone: 257-1186 Email: jurek@cs.uky.edu

INSTRUCTIONS:

Identify the groups or individuals reviewing the proposal; note the date of approval; offer a contact person for each entry; and obtain signature of person authorized to report approval.

Internal College Approvals and Course Cross-listing Approvals:

Reviewing Group	Date Approved	Contact Person (name/phone/email)	Signature
CS Faculty	30 Sept 2015	W. Brent Seales / 7-3063 / seales@uky.edu	
COE Faculty	10-22-15	Kimberly Anderson / 78604 / Kimberly.anderson@uky.edu	
		/ /	
		/ /	
		/ /	

External-to-College Approvals:

Council	Date Approved	Signature	Approval of Revision[4]
Undergraduate Council	12/15/15	Joanie Ett-Mims	
Graduate Council			
Health Care Colleges Council			
Senate Council Approval		University Senate Approval	

Comments:

[4] Councils use this space to indicate approval of revisions made subsequent to that council's approval, if deemed necessary by the revising council.

Computer Science
Engineering Standing

Current Requirements:

Completion of the following courses with a grade-point average of at least 2.50: CS 100, CS 115, CS 215, CS 275, CIS/WRD 110, MA 113, MA 114, PHY 231, PHY 241.

Proposed Requirements:

Completion of the following courses with a grade-point average of at least 2.50: EGR 102, CS 215, CS 275, CIS/WRD 110, MA 113, MA 114, PHY 231, PHY 241.

Brandenburg, Barbara J

From:	Meier, Mark
Sent:	Friday, September 25, 2015 2:36 PM
To:	Lumpp, Janet K
Cc:	Meier, Mark; Selegue, J P; Brandenburg, Barbara J; Hedge, Jesse
Subject:	Re: Enrollment changes due College of Engineering Curriculum Changes

Dr. Lumpp. Thank you for your message. I am now aware of the proposed change to require CHE 105 for students in the Computer Science degree program.

Mark S. Meier
Chair, Department of Chemistry
meier@uky.edu
859 257-7082

On Sep 24, 2015, at 3:14 PM, Lumpp, Janet K <jklumpp@uky.edu> wrote:

Dr. Meier,

The degree programs in the College of Engineering are all proposing undergraduate Curriculum Changes as a result of new common First-Year Engineering courses and other departmental initiatives. I am writing to make you aware of the changes that will affect CHE 105 no earlier than the Fall 2016 semester. As part of the proposal package, we need to include a reply from you acknowledging that you are aware of the changes that will impact enrollment in this course.

CHE 105 will be required for BS degrees in Computer Science

With the addition of Computer Science, all nine degree programs now require CHE 105 and are recommending the course for first semester students enrolling in the College of Engineering. No other changes are proposed for the laboratories or additional chemistry lecture courses.

Please reply all at your earliest convenience.
Thanks,
Janet

--
Dr. Janet K. Lumpp - University of Kentucky

Director, First-Year Engineering Program
Professor, Electrical & Computer Engineering
email: jklumpp@uky.edu
phone: 859-257-4985

Brandenburg, Barbara J

From: Sumit Das <chair@pa.uky.edu>
Sent: Monday, September 28, 2015 11:29 AM
To: Lumpp, Janet K; DAS, SUMIT R
Cc: Anderson, Kimberly; Brandenburg, Barbara J
Subject: Re: Enrollment changes due College of Engineering Curriculum Changes

Dear Dr. Lumpp

Thank you for letting me know about the proposal. This is to let you know that I am aware of the changes in PHY 232, 241 and 242 requirements for engineering students. This will impact the enrollment in these courses significantly.

Best

Sumit Das

On 9/24/2015 3:18 PM, Janet K. Lumpp wrote:
> Dr. Das,
>
> The degree programs in the College of Engineering are all proposing
> undergraduate Curriculum Changes as a result of new common First-Year
> Engineering courses and other departmental initiatives. I am writing
> to make you aware of the changes that will affect several Physics
> courses no earlier than the Fall 2016 semester. As part of the
> proposal package, we need to include a reply from you acknowledging
> that you are aware of the changes that will impact enrollment in these
> courses.
>
> PHY 232 will no longer be required for BS degrees in Computer Science
> PHY 241 will no longer be required for the BS degree in Chemical
> Engineering PHY 242 will no longer be required for BS degrees in
> Computer Science
>
> Please reply all at your earliest convenience.
> Thanks,
> Janet
>

--
Sumit R. Das
Professor and Chair
Department of Physics and Astronomy
University of Kentucky
Lexington, KY 40506
Phone : 859-257-1328

Brandenburg, Barbara J

From:	Brown, Russell
Sent:	Thursday, September 24, 2015 9:57 PM
To:	Lumpp, Janet K
Cc:	Anderson, Kimberly; Brandenburg, Barbara J
Subject:	Re: Enrollment changes due College of Engineering Curriculum Changes

Thanks for your message. By this email, I acknowledge that the Department of Mathematics is aware of these changes in requirements in the College of Engineering and will do our best to adjust our course offerings to accommodate Engineering students.

I would appreciate a notification when the changes are approved so that we will know what to expect during registration.

Sincerely,
Russell Brown
Chair of Math

2015-09-24 15:27 GMT-04:00 Janet K. Lumpp <jklumpp@uky.edu>:
Dr. Brown,

The degree programs in the College of Engineering are all proposing undergraduate Curriculum Changes as a result of new common First-Year Engineering courses and other departmental initiatives. I am writing to make you aware of the changes that will affect several Mathematics courses no earlier than the Fall 2016 semester. As part of the proposal package, we need to include a reply from you acknowledging that you are aware of the changes that will impact enrollment in these courses.

MA 320 will be an optional course (with STA 381) for the BS degree in Electrical Engineering
MA 322 will be an optional course (with CS 321) for the BS degree in Computer Science

Please reply all at your earliest convenience.
Thanks,
Janet

--
Dr. Janet K. Lumpp - University of Kentucky

Director, First-Year Engineering Program
Professor, Electrical & Computer Engineering
email: jklumpp@uky.edu
phone: 859-257-4985

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Brandenburg, Barbara J

From:	Holloway, Lawrence E
Sent:	Tuesday, September 29, 2015 9:20 PM
To:	Lumpp, Janet K
Cc:	Anderson, Kimberly; Brandenburg, Barbara J; Smith, William T; Lumpp, James E; 'Hank Dietz'; danielle green-hinkle
Subject:	RE: Enrollment changes due College of Engineering Curriculum Changes

Janet,

I am replying acknowledging your notification that EE/CS380 will no longer be required by BS-CS. The department will plan future course scheduling offerings accordingly.

I am copying Hank Dietz, the instructor, so that he is aware of this. I am also copying Bill Smith as he is responsible for the class scheduling in our department.

-Larry Holloway

---------- Larry Holloway Chair, Department of Electrical and Computer Engineering Director, Power and Energy Institute of Kentucky TVA Professor of Electrical and Computer Engineering
University of Kentucky, Lexington, KY 40506. USA
phone: 859-323-8523
ECE main phone: 859-257-8042
email: holloway@uky.edu

-----Original Message-----
From: Lumpp, Janet K
Sent: Tuesday, September 29, 2015 2:38 PM
To: Holloway, Lawrence E <larry.holloway@uky.edu>
Cc: Lumpp, Janet K <jklumpp@uky.edu>; Anderson, Kimberly <kimberly.anderson@uky.edu>; Brandenburg, Barbara J <barbara.brandenburg@uky.edu>
Subject: Enrollment changes due College of Engineering Curriculum Changes

Dr. Holloway,

As you know, the degree programs in the College of Engineering are all proposing undergraduate Curriculum Changes as a result of new common First-Year Engineering courses and other departmental initiatives. I am writing to make you aware of the changes that will affect EE380 no earlier than the Fall 2016 semester. As part of the proposal package, we need to include a reply from you acknowledging that you are aware of the changes that will impact enrollment in this course.

EE/CS380 will no longer be required for the BS degree in Computer Science

Please reply all at your earliest convenience.
Thanks,
Janet

--
Dr. Janet K. Lumpp - University of Kentucky

Subject: RE: Changes to Statistic UK Core Requirement - Please respond to this one.
Date: Thursday, February 11, 2016 at 2:57:26 PM Eastern Standard Time
From: Stromberg, Arnold
To: Anderson, Kimberly, Rayens, William S
CC: Lumpp, Janet K

We approve of these changes.

Arnold J. Stromberg
Professor and Chair
Department of Statistics
University of Kentucky
313 Multidisciplinary Science Building
725 Rose Street
Lexington, KY 40536-0082
Phone: 859-257-6115
Fax: 859-323-1973

From: Anderson, Kimberly
Sent: Thursday, February 11, 2016 2:41 PM
To: Rayens, William S; Stromberg, Arnold
Cc: Lumpp, Janet K; Anderson, Kimberly
Subject: Changes to Statistic UK Core Requirement - Please respond to this one.

Hi Arny and Bill

Back in October, Janet Lumpp sent you an email regarding our changes to the Engineering curricula and I see where Arny responded saying that you are aware of the changes and will plan accordingly. We are now being told by the Senate Council that we need a more specific memo from you. As part of our curricular changes, we have 4 programs; Chemical Engineering, Materials Engineering, Electrical Engineering, and Computer Science who have made a change in their curricula that indicates that students are now REQUIRED to take STA 381 for the UK Core Statical Inferential Reasoning. Specifically, the changes are as follow;

Chemical Engineering: Changing UK Core Statical Inferential Reasoning from STAT 210 to STA 381
Materials Engineering: Changing UK Core Statical Inferential Reasoning from STAT 210 to STA 381

Electrical Engineering: Changing UK Core Statical Inferential Reasoning from "Choose one course from approved list" to STA 381
Computer Science: Changing UK Core Statical Inferential Reasoning from "Choose one course from approved list" to STA 381

If you are ok with these changes, please respond back and say you approve.

Thank you!
Kim

****

Dr. Kimberly Anderson, Associate Dean for Administration and Academic Affairs
Professor, Chemical Engineering
College of Engineering
University of Kentucky
371 Ralph G Anderson Building | Lexington, KY 40506-0030 | office 859.257.1864 | fax 859.257.5727
email kimberly.anderson@uky.edu | web http://www.engr.uky.edu

Brandenburg, Barbara J

From: Lumpp, Janet K
Sent: Thursday, October 01, 2015 4:43 PM
To: Brandenburg, Barbara J
Cc: Lumpp, Janet K
Subject: Fwd: Re: Enrollment changes due College of Engineering Curriculum Changes

-------- Forwarded Message --------
Subject: Re: Enrollment changes due College of Engineering Curriculum Changes
Date: Thu, 1 Oct 2015 16:33:25 -0400
From: Meier, Mark <mark.meier@uky.edu>
To: Lumpp, Janet K <jklumpp@uky.edu>
CC: Selegue, J P <selegue@uky.edu>, French, April N <april.french@uky.edu>

Hi Janet. I acknowledge that we have been informed of the proposed change that would remove the CHE 107 requirement for the BS in Mining Engineering and make CHE 111 optional.

Mark S. Meier
Chair, Department of Chemistry
meier@uky.edu
859 257-7082

On Oct 1, 2015, at 4:18 PM, Lumpp, Janet K <jklumpp@uky.edu> wrote:

I missed another change from Mining Engineering. Please acknowledge again.

CHE 107 will no longer be required for the BS in Mining Engineering
CHE 111 will be optional for the BS in Mining Engineering, it was not previously required.

Thanks,
Janet

On 9/25/2015 2:36 PM, Meier, Mark wrote:

Dr. Lumpp. Thank you for your message. I am now aware of the proposed change to require CHE 105 for students in the Computer Science degree program.

Mark S. Meier
Chair, Department of Chemistry
meier@uky.edu
859 257-7082

On Sep 24, 2015, at 3:14 PM, Lumpp, Janet K <jklumpp@uky.edu> wrote:

Dr. Meier,

The degree programs in the College of Engineering are all proposing undergraduate Curriculum Changes as a result of new common First-Year Engineering courses and other departmental initiatives. I am writing to make you aware of the changes that will affect CHE 105 no earlier than the Fall 2016 semester. As part of the proposal package, we need to include a reply from you acknowledging that you are aware of the changes that will impact enrollment in this course.

CHE 105 will be required for BS degrees in Computer Science

With the addition of Computer Science, all nine degree programs now require CHE 105 and are recommending the course for first semester students enrolling in the College of Engineering. No other changes are proposed for the laboratories or additional chemistry lecture courses.

Please reply all at your earliest convenience.
Thanks,
Janet

--
Dr. Janet K. Lumpp - University of Kentucky

Director, First-Year Engineering Program
Professor, Electrical & Computer Engineering
email: jklumpp@uky.edu
phone: 859-257-4985

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Dr. Janet K. Lumpp - University of Kentucky

Director, First-Year Engineering Program
Professor, Electrical & Computer Engineering
email: jklumpp@uky.edu
phone: 859-257-4985

Executive Summary Revised 1/28/16

UK College of Engineering

First-Year Engineering Curriculum and Course Change Proposal

The nine Bachelor of Science degree programs in the UK College of Engineering propose a First-Year Engineering curriculum to increase retention through hands-on laboratory courses, improve preparation for discipline specific coursework and recruit students into a pre-engineering major while they make an informed decision about the degree program best suited to their interests and career goals. Elements of the proposal include:

- Rationale for the First-Year Engineering curriculum
- Three new First-Year courses
    - EGR 101 Engineering Exploration I (1 credit)
    - EGR 102 Fundamentals of Engineering Computing (2 credits)
    - EGR 103 Engineering Exploration II (2 credits)
- One new introductory course for transfer students
    - EGR 112 Engineering Exploration for Transfer Students (1 credit)
- UK Core Arts & Creativity request
- Structure, oversight and assessment of the First-Year Engineering curriculum
- Curriculum Change Forms
    - All nine degree programs incorporating the new EGR courses
    - Additional curriculum revisions in some degree programs
    - Updated Engineering Standing criteria
    - Acknowledgment by departments whose courses will be dropped or added
    - New course and course change applications in eCats

Rationale:

First-Year Engineering (FYE) programs representing multiple engineering disciplines are several decades old and range from a single seminar course to sequences of courses differentiated for pre-calculus to honors students. High school students who are unsure of which type of engineering is most appealing are drawn to schools with broader freshman year experiences with the opportunity to delay the selection of a major. In addition, exposing first year students to hands-on engineering experiences while they are taking their math, chemistry and physics classes not only develops engineering skills early on but increases retention and graduation rates by keeping the students actively engaged in the engineering disciplines. Within the Southeastern Conference engineering schools, five institutions offer FYE courses and none are as comprehensive as the proposed UK FYE content. For example, Vanderbilt University students choose three five-week modules and an optional seminar rather than exposure to all degree programs. University of Tennessee offers Engineering Fundamentals courses which focus on Physics for Engineers for calculus ready students. Texas A&M, University of Alabama and University of Arkansas FYE opportunities are fewer credit hours when compared to the UK COE program with some disciplinary specific coursework. Engineering schools that have adopted a FYE Program have reported improved retention and graduation rates. For example, the University of Tennessee demonstrated an increase in 1st year retention from 60% to 80% and an increase in 6-year graduation rate from 40.5% to 46.6%. Their 6-year graduation rate for females showed a dramatic increase from 39.7% to 51.6%.

Ohio State also adopted a similar program and reported an increase in 6-year graduation rate from 37% to 60% and a first year retention rate of 80%. Tennessee also reported that the grades obtained by their students in higher-level courses increased after adopting the FYE Program.

The College of Engineering is proposing a FYE curriculum where all incoming freshmen engineering students will be admitted as pre-engineering majors and will change to the pre-major of their choice during the spring registration cycle for their 2nd year classes. No additional admission criteria or enrollment limits will prevent students from declaring a major. Each program already has Engineering Standing criteria in place to ensure students are making satisfactory progress toward their degree. All students will be required to complete three Engineering courses EGR 101, 102, 103 during the first year while completing CIS/WRD, science and math classes.

Transfer students will be admitted directly to a pre-major program and enrolled in EGR 112 with other transfer students rather than EGR 101. Both 101 and 112 emphasize study skills and university resources available to help them become successful engineering students. Specific technical skills covered in EGR 101 as modules will also be used in EGR 112, however, transfer students will only need to complete the modules that fill gaps from their previous coursework. Students will not be allowed to earn credit for both EGR 112 and 101 (one or the other). If a student has AP credit or transfer credit for the programming language taught in EGR 102, they will not need to take EGR 102. We do expect everyone to take EGR 103 for the teamwork and design process experience. Transfer students will not be prevented from going forward with coursework in their major and can take the EGR courses simultaneously.

The College of Engineering section of the UK Bulletin has some inconsistencies in the way in which each degree program has presented its Pre-Major Requirements, Major Requirements and criteria for Engineering Standing. Entries in the Curriculum Change forms reflect the current information as it appears in the Bulletin, however, we would like to present a more consistent set of descriptions going forward. For example, the Pre-Major Requirements will now be the courses listed in the first three semesters of each degree program. Engineering Standing criteria are determined by the faculty in each program and calculated based on a subset of the Pre-Major courses in that program. The Major Requirements are now the required courses in semesters four through eight. As a result of these clarifications, it will be much easier for prospective students to compare and contrast their options as part of their decision to choose the UK College of Engineering and subsequently choose their major at the end of the First-Year experience.

EGR Courses:

<u>EGR 101 Engineering Exploration I</u>

1 credit Lecture Major Revision Arts & Creativity

Course Description: Engineering Exploration I introduces students to the creativity inherent in how engineers and computer scientists approach innovation, design and problem solving from blue sky brainstorming to implementing a solution. Students will work in teams, practice with tools of the trade (modeling, analysis and visualization), provide peer reviews and discuss ethical implications of creative endeavors. This class is also a process of personal discovery where students explore a variety of traditional and non-traditional study and learning methods, reflect on the results of using different

methods and determine what work best for their individual learning styles and personality type. The final individual artifact is a Create Your Future project describing the student's exploration of their own talents and aptitudes, discovery process for identifying a specific discipline and a visual presentation of their career goals. Open to students enrolled in the College of Engineering.

Prerequisites: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent.

EGR 102 Fundamentals of Engineering Computing

2 credits Lecture and Lab New course

Course Description: Fundamentals of Engineering Computing introduces students to the practice and principles of computer programming and computational problem solving. Students will engage in hands-on project-based problem solving using modern computer software and hardware, with a particular emphasis on problems and techniques commonly appearing in various domains of engineering. Open to students enrolled in the College of Engineering.

Prerequisites: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent.

EGR 103 Engineering Exploration II

2 credits Lecture and Lab New course Arts & Creativity

Course Description: Engineering Exploration II focuses on a semester long creative engineering design project with students working in teams to apply the skills and tools introduced in EGR 101 (or EGR 112) and EGR 102. Topics and assignments include more in depth engagement with engineering tools for modeling, analysis, visualization, programming, hardware interfacing, team development, documentation and communication. Students gain experience in project management, identifying constraints, accepting and providing critical analysis, iterating to refine their work, and technical report writing.

Prerequisites: Prereq: EGR 102 or equivalent; Prereq or concur: MA 113

EGR 112 Engineering Exploration for Transfer Students

1 credit Lecture New course Arts & Creativity

Course Description: Engineering Exploration for Transfer Students welcomes transfer students to the College of Engineering and introduces them to the creativity inherent in how engineers and computer scientists approach innovation, design and problem solving from blue sky brainstorming to implementing a solution. Students will work in teams, practice with tools of the trade (modeling, analysis and visualization), provide peer reviews and discuss ethical implications of creative endeavors. This class is also a process of personal discovery where students explore a variety of traditional and non-traditional study and learning methods, reflect on the results of using different methods and determine what work best for their individual learning styles and personality type. The final individual artifact is a

Create Your Future project describing the student's exploration of their own talents and aptitudes, discovery process for identifying a specific discipline and a visual presentation of their career goals. Students who received credit for EGR 101 are not eligible for EGR 112..

Prerequisites: Enrolled in the College of Engineering or MA ACT of at least 23 or equivalent. Students who received credit for EGR 101 are not eligible for EGR 112.

UK Core Arts & Creativity Request:

Credit for Intellectual Inquiry – Arts & Creativity is requested for EGR 101, 103 and 112 to provide students with a total of 3 credit hours from two courses. EGR 101 for freshmen and EGR 112 for transfer students include personal reflection assignments, peer feedback and an individual design project on their plans for becoming a successful engineering student. The technical tools used in all three courses are different approaches which can be used independently or simultaneously to design and solve engineering problems. Students will be introduced to disciplinary practices from all engineering degree programs, appropriate resources from each discipline and opportunities for co-curricular involvement with student organizations and local professional societies. The semester-long design project in EGR 103 will involve identifying constraints and requirements, preliminary design reviews and a critical design review where their creative output will be evaluated and feedback into refining their product. The final product will include written and graphical documentation, a working prototype and demonstration of the prototype accomplishing the goals defined at the start of the project.

Active learning methods will be used in EGR 101 and 112 to stimulate small group discussion and peer review of student success strategies, problem solving methods and team teaching of technical skills. The Design Your Process project on individual student success is a fulfillment-focused creative process encouraging students to set academic and professional goals, take personal responsibility for their progress and enjoy time on task in rigorous challenging courses. The team design projects in EGR 103 will be more constraint-focused and product-focused creative endeavors working with a somewhat limited set of materials. Risk-taking will be encouraged in the safer virtual domains of software, simulation, visualization and optimization before committing to the real world assembly of the prototype. Tools including hardware and software, and information literacy on the many aspects of design will be presented and quizzed on a weekly basis. In addition to getting involved in student organizations, students in EGR 101 will be expected to attend a minimum of four Engineering Information Sessions and reflect on the information in preparation for the Change of Major and registration for discipline specific courses.

Structure, Oversight and Assessment of the First-Year Engineering Curriculum:

The FYE Curriculum is under the leadership of the FYE Program headed by Director Janet Lumpp. In the development phase, the Department Chairs and Directors of Undergraduate Studies have provided input as well as a committee of representatives from each degree program defining the technical content appropriate for each EGR course. Regular Title Series Faculty, Lecturers, Staff and Special Title Series Faculty will teach the multiple sections of EGR 101, 102, 103 and 112, along with graduate and undergraduate teaching assistants. In anticipation of a Fall 2016 launch of the new courses, the College

of Engineering plans to hire 4 or 5 additional Lecturers and/or Special Title Series Faculty with academic appointments in departments and effort assigned by the Dean of Engineering to the FYE Program. An Advisory Committee will be formed with one tenured Associate or Full Professor representative from each engineering degree program. The Advisory Committee will conduct annual performance reviews of the Lecturers and STS Faculty, review student course evaluations and evaluate program progress toward goals set by the Dean for recruitment, retention and graduation. In addition, the Advisory Committee will help identify discipline specific content for EGR course assignments and assess how the EGR content is impacting the students and courses during the sophomore, junior and senior years. As part of the annual review process, the Director will solicit input from all of the faculty teaching sections of the EGR 101, 102, 103 and 112 courses and present the results to the Advisory Committee. The Advisory Committee may recommended changes which will then be taken to the FYE Program Faculty and Associate Dean for Administration and Academic Affairs for consideration. Changes will be subject to the appropriate College and University approval procedures which may include review by the College of Engineering Faculty as the faculties of record.

College of Engineering Process and Faculty Approval

Beginning Spring 2014, Dean John Walz and Associate Dean Kim Anderson visited a number of Universities that currently have a Freshman Engineering Program. These included Ohio State, Purdue, University of Michigan and Michigan State. On July 17, 2014, the proposal to adopt a First Year Program was discussed with the Chairs and Associate Deans at an all-day retreat. During Fall 2014 and Spring 2015, the Directors of Undergraduate Studies in the College of Engineering and a working group of interested faculty worked on both the First Year Engineering Program curriculum and the engineering courses that would be offered as part of the program. Each group met at least once a month during this time. On April 28, 2015, a College of Engineering Faculty meeting was held where the First Year Engineering Program and proposed curriculum was presented to the faculty in attendance. The PowerPoint slides were then circulated to the entire faculty for their review. Also in Spring 2015, a search for the Director of the First-year Engineering Program was conducted, resulting in the selection of Dr. Janet Lumpp and 50% appointment to the program. On May 12, 2015 a mandatory meeting with the Chairs and Directors of Undergraduate Studies was conducted with Dean Walz, Associate Dean Anderson and Dr. Lumpp to further discuss the program. At this meeting, it was decided to move forward with the plans. Dr. Lumpp met at least once a month with various stakeholders over the spring and summer of 2015 including the Directors of Undergraduate Studies to develop and revise the original two-course sequence into a three-course sequence and a pathway for transfer students. Another debriefing meeting was held with the Chairs and Directors of Undergraduate Studies on July 10, 2015. During faculty retreats and meetings in August and September of 2015, the faculty in each department reviewed the course descriptions and voted to endorse the program. The Directors of Undergraduate Studies then worked to revise their curricula and faculty again voted as recorded on the Curriculum Change forms. In October 2015, the entire package including the changes in the curricula, new courses and change in courses were reviewed by the College of Engineering Undergraduate Education Team and the College of Engineering faculty prior to being sent to the Undergraduate and Graduate Councils. In addition to College approval, the proposed Freshman Engineering Program was discussed with the Dean's Advisory Council at both Spring and Fall meetings beginning in Spring, 2014 and was very well received by members of the Council.

Biosystems Engineering

Voted at faculty meeting on August 18-19, 2015. Passed unanimously. All active faculty were present at retreat.

Chemical and Materials Engineering

Voted at faculty meeting on August 26, 2015. Passed unanimously. 18 Chemical faculty members (4 Paducah) voted. 7 Materials faculty voted.

Civil Engineering

Voted on August 20, 2015. The count was 18-1.

Electrical and Computer Engineering

Voted at faculty meeting on September 29, 2015. Passed unanimously. 17 faculty members voted.

Computer Science

Voted on August 24, 2015. The count was 18-0.

Mechanical Engineering

Voted at faculty meeting on September 24, 2015. 22 in favor and 2 against.

Mining Engineering

Voted at faculty meeting on September 2, 2015. 6 approved and 1 abstained.