Memorandum

TO: Engineering Curriculum Committee

FROM: Bill Oakes

DATE: January 27, 2018

RE: Agenda for Meeting #6 – Monday, January 29, 201 in ARMS 3041 at 12:30pm

1. Call to order
2. ECC meeting #6 agenda review and approval.
3. Meeting minutes (ECC 5 12/4/2017) review and approval.
4. Consideration by the ECC for approval on behalf of the faculty the following EFD:
    - EFD 21-18 ECE 51214 CMOS Analog IC Design – new graduate course
5. Consideration by the ECC Fast-Track approvals:
    - EFD 37-18 MDE degree requirements clarification
    - EFD 38-18 IDES degree requirements clarification
    - EFD 49-18 FYE requirements update
6. Old Business
7. New business
    - Proposed update to Fast-Tracks
        i. Key words to garner faculty buy-in
    - Discussion of a permanent meeting time
8. Adjournment

PURDUE UNIVERSITY COLLEGE OF ENGINEERING

Engineering Curriculum Committee

Minutes of Meeting #5 **December 4, 2017**

Present:Oakes, Bean, Midkiff, Yuan, Liu, Marais, Krousgrill, Cherkauer, Jeong, Nies, Calve, Harris
Recorder: Ortiz

1. Meeting was called to order at 1:34 pm in ARMS 3001.
2. The agenda for meeting #5 was approved as am by consent.
3. Motion to approve the minutes from meeting #4(11/6/2017) was made by Jeong and seconded by Midkiff. Motion passed with one abstention.
4. A motion to approve on behalf of the faculty was made by Midkiff and second by Calve the following EFD:
    a. EFD 7-18 MSE 60000 Materials Engineering Fundamentals- new graduate course

Motion passed unanimously.

5. A motion to approve on behalf of the faculty was made by Marais and second by Midkiff the following EFDs:
    a. EFD 8-18 AAE 54500 Dynamic Behavior of Materials – new graduate course
    b. EFD 9-18 AAE 54800 Mechanical Behavior of Aerospace Materials – new graduate course
    c. EFD 10-18 AAE 64800 Modeling Damage and Strengthening Mechanisms in Materials – new graduate class

Motion passed unanimously.

6. A motion to approve on behalf of the faculty was made by Bean and second by Midkiff the following EFDs:
    a. EFD 11-18 ENE 29100 Industrial Practice – course deletion
    b. EFD 12-18 ENE 48300 Multidisciplinary Engineering Analysis & Decision Making – course revision

Motion passed unanimously.

7. A motion was made by Calve and seconded by Liu to approve for distribution to the faculty the following EFDs:
    a. EFD 22-18 BME 56100 Preclinical and Clinical Study Design – new graduate course
    b. EFD 23-18 BME 52600 Regulatory Issues Surrounding Approval of Biomedical Devices – new graduate course
    c. EFD 24-18 BME 56300 Quality Systems for Regulatory Compliance – new graduate course

    Discussion led by Calve. Motion passed unanimously.

8. A motion was made by Jeong and seconded by Calve to approve for distribution to the faculty the following EFDs:
    a. EFD 1-18 CE 59601 Entrepreneurship and Business Strategy in Engineering – new graduate course
    b. EFD 3-18 CE 59800 Breakthrough Thinking for Complex Challenges – new graduate course

Discussion led by Jeong. Motion passed unanimously.

9. A motion was made by Krousgrill and seconded by Midkiff to approve for distribution to the faculty the following EFD:
    a. EFD 19-18 ME BSME Curriculum Changes

Discussion led by Krousgrill. Motion passed unanimously.

10. A motion was made by Calve and seconded by Nies to approve for distribution to the faculty the following EFDs:
    a. EFD 14-17 ECE 60268 Hybrid Systems: Theory and Applications – New graduate course

    Discussion led by Midkiff. Motion passed unanimously.
    b. EFD 21-18 ECE 51214 CMOS Analog IC Design – new graduate course

    Discussion led by Midkiff. Motion passed unanimously.
11. Old Business – A final vote on behalf of the faculty occurred online for the following EFDs:
    a. EFD 5-18 ENGR 49000 Breakthrough Thinking for Complex Challenges – new undergraduate course
    b. EFD 6-18 ENGR 30500 Fundamentals of Innovation Theory and Practice – new undergraduate course
12. Motion to adjourn was made by Kvam and seconded by Midkiff. The meeting adjourned at 2:01pm. The next meeting will be in January.

TO: The Faculty of the College of Engineering

FROM: School of Electrical and Computer Engineering of the College of Engineering

RE: New Graduate Course, ECE 51214 CMOS Analog IC Design

The faculty of the School of Electrical and Computer Engineering has approved the following new course. This action is now submitted to the Engineering Faculty with a recommendation for approval.

ECE 51214 CMOS Analog IC Design
Sem. 1, Lecture 3, Cr. 3.

Prerequisite: ECE 255 or equivalent courses or consent of instructor

Prerequisite by Topic: General knowledge of terminology and concepts from undergraduate courses in circuit design and microelectronics; familiarity with SPICE

Description: The course covers general topics in CMOS analog IC design; biasing, noise, single stage amplifiers, differential amplifiers, OP-Amp, OTA, frequency domain analysis, and active filters. While the focus of the course is on CMOS IC design, design in bipolar and Bi CMOS technologies are introduced as well. A design project is a key component of the course. The students conduct group or individual design projects. Process Design *Kit* and EDA tools are provided for the design projects.

Reason: Since this course covers broad topics in CMOS IC design, it is appropriate for entry level graduate students or advanced undergraduates who have general knowledge of terminology and concepts from undergraduate courses in circuit design and microelectronics. Two undergraduate students had enrolled during the first offer, and both got B. About 5 undergraduate students had enrolled during the second offer, but all of them dropped in the first two weeks. The main complaint from the undergraduate students was design project load. There were complains about the size of the design project from a few grad students, too. The layout and post-layout simulation parts will be removed from the design project to reduce the course load to a reasonable level, and to encourage motivated undergraduate students to enroll this course. The layout and post-layout simulation will be covered as a homework using relatively small size circuit.

Michael R. Melloch, Associate Head
School of Electrical and Computer Engineering

Office of the Registrar
FORM 40G REV. 4/13

PURDUE UNIVERSITY
REQUEST FOR ADDITION, EXPIRATION, OR REVISION OF A GRADUATE COURSE
(50000-60000 LEVEL)

DEPARTMENT: Electrical and Computer Engineering EFFECTIVE SESSION: Spring 2018

INSTRUCTIONS: Please check the items below which describe the purpose of this request.

- [x] 1. New course with supporting documents (complete proposal form)
- [ ] 2. Add existing course offered at another campus
- [ ] 3. Expiration of a course
- [ ] 4. Change in course number
- [ ] 5. Change in course title
- [ ] 6. Change in course credit/type
- [ ] 7. Change in course attributes
- [ ] 8. Change in instructional hours
- [ ] 9. Change in course description
- [ ] 10. Change in course requisites
- [ ] 11. Change in semesters offered
- [ ] 12. Transfer from one department to another

PROPOSED:		EXISTING:	
Subject Abbreviation	ECE	Subject Abbreviation	
Course Number	51214	Course Number	

Long Title: CMOS Analog IC Design

Short Title: CMOS Analog IC Design
Abbreviated title will be entered by the Office of the Registrar if omitted. (30 CHARACTERS ONLY)

TERMS OFFERED
Check All That Apply:
- [x] Fall
- [ ] Spring
- [ ] Summer

CAMPUS(ES) INVOLVED
- [ ] Calumet
- [ ] Cont Ed
- [ ] Ft. Wayne
- [ ] Indianapolis
- [ ] N. Central
- [ ] Tech Statewide
- [x] W. Lafayette

CREDIT TYPE
1. Fixed Credit: Cr. Hrs. 3
2. Variable Credit Range:
   Minimum Cr. Hrs
   (Check One) To [ ] Or [ ]
   Maximum Cr. Hrs
3. Equivalent Credit: Yes [ ] No [x]
4. Thesis Credit: Yes [ ] No [x]

COURSE ATTRIBUTES: Check All That Apply
1. Pass/Not Pass Only [ ]
2. Satisfactory/Unsatisfactory Only [ ]
3. Repeatable [ ]
   Maximum Repeatable Credit: [ ]
4. Credit by Examination [ ]
5. Fees [ ] Coop [ ] Lab [ ] Rate Request
   Include comment to explain fee
6. Registration Approval Type
   Department [ ] Instructor [ ]
7. Variable Title [ ]
8. Honors [ ]
9. Full Time Privilege [ ]
10. Off Campus Experience [ ]

Schedule Type	Minutes Per Mtg	Meetings Per Week	Weeks Offered	% of Credit Allocated
Lecture	50	3	16	100
Recitation				
Presentation				
Laboratory				
Lab Prep				
Studio				
Distance				
Clinic				
Experiential				
Research				
Ind. Study				
Pract/Observ				

Cross-Listed Courses

COURSE DESCRIPTION (INCLUDE REQUISITES/RESTRICTIONS):
The course covers general topics in CMOS analog IC design; biasing, noise, single stage amplifiers, differential amplifiers, OP-Amp, OTA, frequency domain analysis, and active filter. While the focus of the course is on CMOS IC design, design in bipolar and BiCMOS technologies are introduced as well. A design project is a key component of the course. The students conduct group or individual design project. Process

*COURSE LEARNING OUTCOMES:
Attached

Calumet Department Head	Date	Calumet School Dean	Date	Calumet Director of Graduate Studies	Date
Fort Wayne Department Head	Date	Fort Wayne School Dean	Date	Fort Wayne Director of Graduate Studies	Date
Indianapolis Department Head	Date	Indianapolis School Dean	Date	IUPUI Associate Dean for Graduate Education	Date
North Central Department Head	Date	North Central School Dean	Date	North Central Director of Graduate Studies	Date
M. R. Melloch	10/17/17				
West Lafayette Department Head	Date	West Lafayette College/School Dean	Date	Date Approved by Graduate Council	Date
Graduate Area Committee Convener	Date	Graduate Dean	Date	Graduate Council Secretary	Date
				West Lafayette Registrar	Date

OFFICE OF THE REGISTRAR

Outcomes: ECE 51214 CMOS Analog IC Design

ECE Graduate Learning Outcomes:

a. Knowledge and Scholarship (thesis/non-thesis)
b. Communication (thesis/non-thesis)
c. Critical Thinking (thesis/non-thesis)
d. Ethical and Responsible Research (thesis) or Professional and Ethical Responsibility (non-thesis)

- List Learning Objectives for this course and map each Learning Objective to one or more of the ECE Graduate Learning Outcomes (a-d, listed above):

    - Learn a basic knowledge of bias circuits [a,c]
    - Learn a basic knowledge of noise analysis [a,c]
    - Learn a basic knowledge of single stage amplifiers and their applications [a,c,d]
    - Learn a basic knowledge of differential Op-amp, OTA, and practical design skills [a,b,c,d]
    - Learn a basic knowledge of feedback circuits [a,c,d]
    - Learn a basic knowledge of active filters, practical design skills and applications [a,b,c,d]

Supporting Document to the Form 40G for a New Graduate Course

To: Purdue University Graduate Council

From: Faculty Member: Byunghoo Jung

Department: Electrical and Computer Engineering

Campus: West Lafayette

Date:

Subject: Proposal for New Graduate Course

Contact for information if questions arise:

Name: Matt Golden
Phone: 494-3374
Email: goldenm@purdue.edu
Address: EE Building, Room 135

Course Subject Abbreviation and Number: ECE 51214

Course Title: CMOS Analog IC Design

Course Description:

The course covers general topics in CMOS analog IC design; biasing, noise, single stage amplifiers, differential amplifiers, OP-Amp, OTA, frequency domain analysis, and active filter. While the focus of the course is on CMOS IC design, design in bipolar and BiCMOS technologies are introduced as well. A design project is a key component of the course. The students conduct group or individual design project. Process Design *Kit* and EDA tools are provided for the design project.

Semesters Offered:

For the benefit of graduate student plan of study development, how frequently will this prototype be offered? Which semesters?
Each Fall

A. Justification for the Course:

Provide a complete and detailed explanation of the need for the course (e. g., in

the preparation of students, in providing new knowledge/training in one or more topics, in meeting degree requirements, etc.), how the course contributes to existing majors and/or concentrations, and how the course relates to other graduate courses offered by the department, other departments, or interdisciplinary programs.

Justify the level of the proposed graduate course (500- or 600-level) including statements on, but not limited to: (1) the target audience, including the anticipated number of undergraduate and graduate students who will enroll in the course; and (2) the rigor of the course.

> Since this course covers broad topics in CMOS IC design, it is appropriate for entry level graduate students or advanced undergraduates who have general knowledge of terminology and concepts from undergraduate courses in circuit design and microelectronics. Two undergraduate students had enrolled during the first offer, and both got B. About 5 undergraduate students had enrolled during the second offer, but all of them dropped in the first two weeks. The main complaint from the undergraduate students was design project load. There were complains about the size of the design project from a few grad students, too. The layout and post-layout simulation parts will be removed from the design project to reduce the course load to a reasonable level, and to encourage motivated undergraduate students to enroll this course. The layout and post-layout simulation will be covered as a homework using relatively small size circuit.

Use the following criteria:
Graduate Council policy requires that courses at the 50000 level in the Purdue system should be taught at the graduate level and meet four criteria: a) the use of primary literature in conjunction with advanced secondary sources (i.e., advanced textbooks); b) assessments that demonstrate synthesis of concepts and ideas by students; c) demonstrations that topics are current, and; d) components that emphasize research approaches/methods or discovery efforts in the course content area (reading the research, critiquing articles, proposing research, performing research). Such courses should be taught so that undergraduate students are expected to rise to the level of graduate work and be assessed in the same manner as the graduate students.

- Anticipated enrollment
  - Undergraduate 2-5
  - Graduate 20-25

B. Learning Outcomes and Method of Evaluation or Assessment:

ECE Graduate Learning Outcomes:

a. Knowledge and Scholarship (thesis/non-thesis)
b. Communication (thesis/non-thesis)
c. Critical Thinking (thesis/non-thesis)
d. Ethical and Responsible Research (thesis) or Professional and Ethical Responsibility (non-thesis)

- List Learning Objectives for this course and map each Learning Objective to one or more of the ECE Graduate Learning Outcomes (a-d, listed above):

    - Learn a basic knowledge of bias circuits [a,c]
    - Learn a basic knowledge of noise analysis [a,c]
    - Learn a basic knowledge of single stage amplifiers and their applications [a,c,d]
    - Learn a basic knowledge of differential Op-amp, OTA, and practical design skills [a,b,c,d]
    - Learn a basic knowledge of feedback circuits [a,c,d]
    - Learn a basic knowledge of active filters, practical design skills and applications [a,b,c,d]

- Methods of Instruction

    - Lecture

- Will/can this course be offered via Distance Learning?

    - No

- Grading Criteria

  Grading criteria (select from checklist); include a statement describing the criteria that will be used to assess students and how the final grade will be determined. Add and delete rows as needed.

    - exams and/or quizzes
    - papers and/or projects

  ▶ Describe the criteria that will be used to assess students and how the final grade will be determined:
  The course will be graded primarily on a combination of examinations and course projects. A smaller part of the grade will be based on homework, quiz, and class participation. The examination component will include two mid-term exams. The course project component will include interim and final design reports.

C. Prerequisite(s):

List prerequisites and/or experiences/background required. If no prerequisites are indicated, provide an explanation for their absence. Add bullets as needed.

- ECE 255 or equivalent courses or consent of instructor

Prerequisite by Topic: General knowledge of terminology and concepts from undergraduate courses in circuit design and microelectronics; familiarity with SPICE

D. Course Instructor(s):

Provide the name, rank, and department/program affiliation of the instructor(s). Is the instructor currently a member of the Graduate Faculty? (If the answer is no, indicate when it is expected that a request will be submitted.) Add rows as needed.

Name	Rank	Dept.	Graduate Faculty or expected date
Byunghoo Jung	Associate Professor	ECEN	Yes

E. Course Outline:

Provide an outline of topics to be covered and indicate the relative amount of time or emphasis devoted to each topic. If laboratory of field experiences are used to supplement a lecture course, explain the value of the experience(s) to enhance the quality of the course and student learning. For special topics courses, include a sample outline of a course that would be offered under the proposed course. **(This information must be listed and may be copied from syllabus).**

Lectures	Principal Topics
1	CMOS device physis review
3	Spice models and layout
2	Current biasing
2	Voltage reference
5	Noise analysis
7	Single stage amplifiers
6	OTA and Opamp design
4	Gain boosting and bandwidth extention

4	Feedback
4	Stability and compensation
1	Integrated active filter design
3	Switched capacitor filter design

F. Reading List (including course text):

A primary reading list or bibliography should be limited to material the students will be required to read in order to successfully complete the course. It should not be a compilation of general reference material.

A secondary reading list or bibliography should include material students may use as background information.

- Primary Reading List
    - Design of Analog CMOS Integrated Circuits by Behzad Razavi (MaGraw- Hill) (ISBN 0-07-238032-2)
- Secondary Reading List
    - CMOS Analog Circuit Design by Phillip E. Allen (Oxford) (ISBN 0-19-511644-5) Analog Integrated Circuit Design by David Johns and Ken Martin (Wiley) (ISBN 0-471- 14448-7)
    - CMOS Circuit Design, Layout, and Simulation (Wiley) (ISBN 978-0-470-22941-5)

G. Library Resources

Describe any library resources that are currently available or the resources needed to support this proposed course.

H. Course Syllabus

(While not a necessary component of this supporting document, an example of a course syllabus is available, for information, by clicking on the link below, which goes to the *Graduate School's Policies and Procedures Manual for Administering Graduate Student Program.*
See Appendix K.
http://www.purdue.edu/gradschool/faculty/documents/Graduate_School_Policies_and_Procedures_Manual.pdf

ECE595 CMOS Analog IC Design (3Cr), Fall 2017

Class Schedule: MWF 3:30AM ~ 4:20PM, EE 222

Important Announcement Regarding Campus Emergency:
In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances. In such an event, information will be provided through Blackboard Learn.

Prerequisite:

- ✓ ECE 255 Introduction to Electronic Analysis and Design or Equivalent

Requisites by Topic: General knowledge of terminology and concepts from undergraduate courses in circuit design and microelectronics; familiarity with SPICE

Instructor: Byunghoo Jung (494-2866, jungb@prudue.edu)
Office hours: MWF 1:30AM-2:30PM or by appointment (Room WANG 2053)

Class Website: Blackboard Learn

Required Text: Design of Analog CMOS Integrated Circuits by Behzad Razavi (MaGraw-Hill)

Recommended Text(s):

1. *Analog Integrated Circuit Design*, David Johns and Ken Martin, Wiley, ISBN No. 0471144487.
2. *CMOS Analog Circuit Design*, Phillip E. Allen, Oxford, ISBN No. 0195116445.
3. *CMOS Circuit Design, Layout, and Simulation*, Wiley, ISBN No. 9780470229415.

Course Description: The course covers general topics in CMOS analog IC design; biasing, noise, single stage amplifiers, differential amplifiers, OP-Amp, OTA, frequency domain analysis, and active filter. While the focus of the course is on CMOS IC design, design in bipolar and BiCMOS technologies are introduced as well. A design project is a key component of the course. The students conduct group or individual design project. Process Design Kit and EDA tools are provided for the design project.

Course Objectives:
A student who successfully fulfills the course requirements will have demonstrated:

i. a basic knowledge of bias circuits [a,c]
ii. a basic knowledge of noise analysis [a,c]
iii. an understanding of single stage amplifiers and their applications [a,c,d]
iv. an understanding of differential Op-amp ,OTA, and practical design skills. [a,b,c,d]

v. an understanding of feedback circuits [a,c,d]

vi. an understanding of basic active filters, practical design skills and applications [a,b,c,d]

Assessment Method for Learning Objectives: 2 midterm exams and design projects: i. The first midterm exam covers bias circuit design, noise analysis, and single stage amplifiers ii. The second midterm exam covers differential Opamp, OTA, frequency domain analysis, and active filter design iii. The students are asked to demonstrate their project design (schematic level) at the end of the semester

Exam and Design Project Schedule

- ✓ **Project Proposal Due:** submit to the instructor through email by 6:00PM on Sept. 15 (Fri)
- ✓ **First Exam**: Oct. 18 (Wed) In-class exam, close book/notebook, single-side Letter size paper with equations
- ✓ **Interim Project Report Due:** submit to the instructor by 6:00PM on Nov. 01 (Wed)
- ✓ **Second Exam**: Nov. 20 (Mon) In class exam, open book, open notebook
- ✓ **Final Project Report Due:** submit to the instructor by 6:00PM on Dec. 11 (Mon)
- ✓ **Submit homework and project reports to Instructor:** E-mail submission is recommended. **PDF (or MS-Word) format only!**

Grading Policy

- ✓ Absolute and relative scale:
  - ➢ When the average is lower than 65/100: 25% A, 40%B, 25% C, 10% D/F
  - ➢ When the average is over 65/100: 35% A, 40% B, 20% C, 5% D/F
  - ➢ When the average is over 75/100: 40% A, 50% B, 10% C
- ✓ 2 mid-terms each accounting for 25% of the grade ($25\% \cdot 2 = 50\%$)
- ✓ Design Project accounts for 40% of the grade
- ✓ Homework assignments account for 10%
- ✓ Late projects or assignments will **NOT** be accepted
  - ➢ You may request extension for homework assignment or make-up exam for documented emergencies (e.g. hospitalization, death of family member, etc.) It has to be requested BEFORE its due date except campus emergency.
- ✓ Any form of cheating will be reported to the Dean of students AND result in a failing grade
- ✓ Must fulfill ABET requirements to get a passing grade

CAD LAB

- ✓ VLSI CAD Lab located in MSEE189 and 360 Potter Engineering Center
- ✓ Linux/SUN workstations running Cadence and HSpice
- ✓ Courtesy key for after-hour access can be obtained from front desk in Potter Engineering Library

Collaboration and Academic Honesty Policy

ECE595 CMOS Analog IC Design (3Cr), Fall 2017

Limited collaboration among students on the design project and homework problems is encouraged. Such collaboration may include verbal discussion of problems, and the use of scratch paper or writing boards to discuss concepts and approaches to solving specific problems. It is also OK for students to verbally compare the final answers obtained for a given problem as a method of checking their work. However, if you collaborate with others, please list the names of all those with whom you collaborated at the top of each solution set you hand in.

The following academic honesty rules should be considered in force at all times:

- ✓ Never show any draft of a homework solution to another student in the class until after the homework due date and after that person has handed in his/her own solution set.
- ✓ Never look at any draft of another person's homework solution until after the homework due date and after you have handed in your solution set.
- ✓ Never use another person's simulation files or supply your simulation files to another person for design project.

If any of the above academic honesty rules are violated by any student in the course, the student will receive a failing grade for the course and the incident will be reported to the Dean of the Student for further administrative action.

Lecture Outline:

Lectures	Principal Topics
1	CMOS device physic review
3	Spice models and layout
2	Current biasing
2	Voltage reference
5	Noise analysis
7	Single stage amplifiers
6	OTA and Op-amp design
4	Gain boosting and bandwidth extension
4	Feedback
4	Stability and compensation
1	Integrated active filter design
3	Switched capacitor filter design

TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Engineering Education

RE: Fast Track Action for Clarification to General Education Requirements: BSE degree in Multidisciplinary Engineering (MDE)

The Faculty of the School of Engineering Education has approved the attached degree requirement clarification. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Summary of Proposed Changes:

This EFD clarifies MDE degree program requirements around the use of pass/no-pass course grading for all program requirements including the University general education requirement. Specifically, all courses applied to a MDE student's plan of study must be taken for a letter grade (i.e. A, B, C etc.), this includes general education elective courses which must be taken for a letter grade and achieve a grade of a C- or above to meet program requirements.

Detailed Degree Requirements:

See attachment.

Current Requirements:

Based on EFD 73-17. See attachment.

Effective Date:

Effective for all students entering Purdue Fall 2018 or later

Reasons:

EFD 73-17 updated the MDE program requirements to defer to the then new College of Engineering general education policy (ref EFD 39-14). This EFD clarifies the standing MDE program interpretation and application of EFD 39-14, requiring letter grading for any general education requirement.

Donna Riley, Kamyar Haghighi Head
Professor of Engineering Education

Existing

120 credit Degree Requirements for Bachelor of Science in Engineering (BSE) Degree in Multidisciplinary Engineering

Definition	Credits
First-Year Engineering Program ▪ If the common first-year program in engineering is changed, the BSE requirements will be changed to reflect these changes.	29-33
Required sophomore mathematics ▪ Multivariate calculus (MA 26100), and linear algebra & differential equations, MA 26200 or (MA 26500 & 26600), or equivalent.	8-10
Sophomore Science selective ▪ ENE approved selective.	3-4
Statistics selective ▪ ENE approved statistics course from the Department of Statistics or approved engineering statistics course.	3 counted elsewhere
Accreditation Requirement for Mathematics and Basic Sciences ▪ There must be a minimum of 30 credits of ENE approved mathematics and basic sciences (biological, chemical and physical).	minimum of 30
Oral Communication ▪ Com 11400 or equivalent course taken from Engineering's General Education Program requirements.	3
Written Communication ▪ ENGL 106 or 108 or equivalent course taken from Engineering's General Education Program requirements.	3 or 4
General Education ▪ Follow Engineering's General Education Program requirements. ▪ *If EPICS is used to satisfy the Science, Technology & Society Outcome, three credits of EPICS are required*	17-18
Engineering ▪ Credits at 20000 + levels, of which *at least 18 credits are at 30000+* levels and *6 credits of the 18 must be at 40000+ level*. ▪ Maximum number of credits from any engineering discipline is 24.	minimum of 45
Required Engineering Core ▪ Can substitute or transfer equivalent courses ***except for*** IDE 30100, IDE 48700 *and major design experience courses*, which must be taken at Purdue-West Lafayette campus.	

Topic:	Example Courses	Credits
Electrical Circuits	ECE 20100 or equivalent	3
Statics and Dynamics	(ME 27000 + 27400), A&AE 20300, (CE 29700 + 29800) or equiv	3/6
Fluid Mechanics	ME 30900 (1 cr. counts as lab), CE 34000, A&AE 33300 & 33300L (1 cr. Counts as lab), ChE 37700 (1 cr. Counts as lab) or equivalent	3

Definition		Credits
Thermodynamics	ME 20000, ABE 20100, ABE 21000, ChE 21100 or equivalent	3 or 4
Engineering Economics	IE 34300 (3 cr) or IDE 48300 (1 cr) or equivalent	1 or 3
Major Design Experience	EPCS 41100 & 41200, IDE 48400 & 48500, or other approved major design experience courses.	3 or 4
Professional Preparation	IDE 30100 (1) and IDE 48700 (1)	2
	Typical Engineering Core Total Credits	
	Most Common Core	**22**
Engineering Selectives: Do parts a, b, and c.		**Credits**
a. Three additional credits of engineering design	Must be approved by School of Engineering Education.	3
b. Three credits of ENE approved hands-on laboratory (not computer lab)	At least 2 credits must be in engineering.	1 cr lab (may be non-engr) + 2 engr lab
c. ENE approved engineering course in materials or strength of materials		3
	Total Credits Engineering Selectives	**8 engr + 1 cr lab**
Engineering Area		***Credits***
▪ Each plan of study may include required engineering courses, engineering selectives and/or electives; may also include extra engineering laboratory or design credits.		Typically 9-18
	Minimum Engineering Credits @ 20000 + Level	**45**
Area		***Credits***
▪ Chosen to satisfy educational objectives. For each plan of study may include required courses, selectives and/or electives.		Typically 8-16
	Minimum Required for Graduation	**120**

Other Graduation Requirements:

- Plans of study for all concentrations must be approved by the School of Engineering Education. All concentrations must be sufficiently different from plans of study in other Schools of Engineering (outside of ENE) so student's educational goals *could not be met in one of those Schools*.
- An overall Graduation Index of 2.0 or higher and a minimum GPA of 2.0 in the engineering courses at the 20000 level and higher included in the plan of study are required.
- All other Purdue University graduation requirements must be satisfied.

Proposed

120 credit Degree Requirements for Bachelor of Science in Engineering (BSE) Degree in Multidisciplinary Engineering

Definition	Credits
First-Year Engineering Program ▪ If the common first-year program in engineering is changed, the BSE requirements will be changed to reflect these changes.	29-33
Required sophomore mathematics ▪ Multivariate calculus (MA 26100), and linear algebra & differential equations, MA 26200 or (MA 26500 & 26600), or equivalent.	8-10
Sophomore Science selective ▪ ENE approved selective.	3-4
Statistics selective ▪ ENE approved statistics course from the Department of Statistics or approved engineering statistics course.	3 counted elsewhere
Accreditation Requirement for Mathematics and Basic Sciences ▪ There must be a minimum of 30 credits of ENE approved mathematics and basic sciences (biological, chemical and physical).	minimum of 30
Oral Communication ▪ Com 11400 or equivalent course taken from Engineering's General Education Program requirements.	3
Written Communication ▪ ENGL 106 or 108 or equivalent course taken from Engineering's General Education Program requirements.	3 or 4
General Education ▪ ~~Follow Engineering's General Education Program requirements~~. Students must take any course selected for a letter grade and earn a C- or better in order to receive credit for meeting the Foundational Learning Outcomes and this General Education requirement [a unit level requirement]. The P/NP option is not available for this requirement. ▪ *If EPICS is used to satisfy the Science, Technology & Society Outcome, three credits of EPICS are required*	17-18
Engineering ▪ Credits at 20000 + levels, of which *at least 18 credits are at 30000+* levels and *6 credits of the 18 must be at 40000+ level*. ▪ Maximum number of credits from any engineering discipline is 24.	minimum of 45
Required Engineering Core ▪ Can substitute or transfer equivalent courses ***except for*** IDE 30100, IDE 48700 *and major design experience courses*, which must be taken at Purdue-West Lafayette campus.	

Topic:	Example Courses	Credits
Electrical Circuits	ECE 20100 or equivalent	3
Statics and Dynamics	(ME 27000 + 27400), A&AE 20300, (CE 29700 + 29800) or equiv	3/6

Fluid Mechanics	ME 30900 (1 cr. counts as lab), CE 34000, A&AE 33300 & 33300L (1 cr. Counts as lab), ChE 37700 (1 cr. Counts as lab) or equivalent	3
Thermodynamics	ME 20000, ABE 20100, ABE 21000, ChE 21100 or equivalent	3 or 4
Engineering Economics	IE 34300 (3 cr) or IDE 48300 (1 cr) or equivalent	1 or 3
Major Design Experience	EPCS 41100 & 41200, IDE 48400 & 48500, or other approved major design experience courses.	3 or 4
Professional Preparation	IDE 30100 (1) and IDE 48700 (1)	2
	Typical Engineering Core Total Credits	
	Most Common Core	**22**
Engineering Selectives: Do parts a, b, and c.		**Credits**
a. Three additional credits of engineering design	Must be approved by School of Engineering Education.	3
b. Three credits of ENE approved hands-on laboratory (not computer lab)	At least 2 credits must be in engineering.	1 cr lab (may be non-engr) + 2 engr lab
c. ENE approved engineering course in materials or strength of materials		3
	Total Credits Engineering Selectives	**8 engr + 1 cr lab**
Engineering Area		***Credits***
▪ Each plan of study may include required engineering courses, engineering selectives and/or electives; may also include extra engineering laboratory or design credits.		Typically 9-18
	Minimum Engineering Credits @ 20000 + Level	**45**
Area		***Credits***
▪ Chosen to satisfy educational objectives. For each plan of study may include required courses, selectives and/or electives.		Typically 8-16
	Minimum Required for Graduation	**120**

Other Graduation Requirements:

- Plans of study for all concentrations must be approved by the School of Engineering Education. All concentrations must be sufficiently different from plans of study in other Schools of Engineering (outside of ENE) so student's educational goals *could not be met in one of those Schools*.
- Courses selected for use on the approved plan of study must be taken for a letter grade. Students must take any course selected for a letter grade and earn a C- or better in order to receive credit for meeting degree requirements [a unit level requirement]. The P/NP option is not available for any course taken as part of degree requirements.
- An overall Graduation Index of 2.0 or higher and a minimum GPA of 2.0 in the engineering courses at the 20000 level and higher included in the plan of study are required.
- All other Purdue University graduation requirements must be satisfied.

TO: The Faculty of the College of Engineering

FROM: The Faculty of the School of Engineering Education

RE: Fast Track Action on Clarification to General Education Requirements: BS degree in Interdisciplinary Engineering Studies (IDES)

The Faculty of the School of Engineering Education has approved the attached degree requirement clarifications. This action is now submitted to the Engineering Faculty with a recommendation for approval.

Summary of Proposed Changes:

This EFD clarifies IDES degree program requirements around the use of pass/no-pass course grading for all program requirements including the University general education requirement. Specifically, all courses applied to a IDES student plan of study must be taken for a letter grade (i.e. A, B, C, etc.), this includes general education elective courses which must be taken for a letter grade and achieve a grade of a C- or above to meet program requirements.

Detailed Degree Requirements:

See attachment.

Current Requirements:

Based on EFD 71-13. See attachment.

Effective Date:

Effective for all students entering Purdue Fall 2018 or later

Reasons:

EFD 71-13 updated the IDES program requirements to defer to the then new College of Engineering general education policy (ref EFD 39-14). This EFD clarifies the standing IDES program interpretation and application of EFD 39-14, requiring letter grading for any general education requirement. IDES is a non-ABET accredited program.

Donna Riley, Kamyar Haghighi Head
Professor of Engineering Education

Existing

Degree Requirements for Bachelor of Science (BS) Degree in Interdisciplinary Engineering Studies

(Not ABET Accredited)

Definition	Credits
First-Year Engineering Program ▪ If the common first-year program in engineering is changed, the BS requirements will be changed to reflect these changes.	29-33
Communications ▪ Com 11400 or equivalent. Must select a course that satisfies the Purdue University Foundational Learning Outcome in Oral Communication, and satisfies 3 credits of the general education program. ▪ Recommendation: take Com 11400 as part of the FYE program.	3 counted in FYE program
English ▪ ENGL 10600 or 10800. Must select a course that satisfies the Purdue University Foundational Learning Outcomes in Information Literacy and in Written Communication. This requirement satisfies 3 or 4 credits of the Engineering general education program. ▪ Recommendation: take ENGL 10600 or 10800 as part of the FYE program.	3 or 4 counted in FYE program
General Education ▪ Follow Engineering's General Education Program requirements. ▪ A total of at least 24 credits are required - 6 or 7 of these credits for Com and ENGL are counted in the FYE program. The remaining credits must be chosen to satisfy the Purdue University Foundational Learning Outcomes in Humanities, Behavior/Social Science and Science, Technology & Society. ▪ At least 18 credits of the General Education program (including Com and ENGL) must be taken outside of the Colleges of Engineering, Science, and Technology. Courses from the Colleges of Engineering, Science and Technology used in the General Education Program may only be used to satisfy Purdue University Foundational Learning Outcomes in Humanities, Behavior/Social Science and Science, Technology & Society (they cannot be used to add depth or non-technical breadth). If EPICS is used to satisfy the Science, Technology & Society Outcome, three credits of EPICS are required. The engineering (at 20000 and higher level) and science credits used in the General Education program can also be used to satisfy the engineering requirements and MBSE science requirements, respectively , but credits are not double-counted for graduation . ▪ At least 6 credit hours must come from courses at the 30000 level or above, or from courses with a required prerequisite in the same department. ▪ Note: Individual plans of study may recommend particular general education courses.	17-18
Economics Selective ▪ Take ECON 25100, ECON 25200, or IE 34300. ▪ Credits for ECON 25100 or 25200 satisfy Purdue University Foundational Learning Outcomes in Behavior/Social Science and count in the General Education package. ▪ Credits for IE 34300 count in Engineering.	3-6

Definition	Credits
Math, Basic Science and Engineering (MBSE) ▪ Required sophomore mathematics. ▪ Multivariate calculus (MA 26100), and linear algebra & differential equations, MA 26200 or (MA 26500 & 26600), or equivalent.	8-10
Sophomore Science Selective ▪ ENE approved selective. (May not be the same course used as FYE Science Selective.)	3-4
Statistics Selective ▪ ENE approved statistics course from the Department of Statistics or approved engineering statistics course. The engineering courses count towards the required 30 credits in engineering. Statistics courses count towards the MBSE requirements. ▪ Engineering: Minimum 30 credits at 20000+ level, of which at least 15 credits are at 30000 + level. Maximum number of credits in any one engineering discipline is 24. ▪ **Note: It is the student's responsibility to see that all prerequisites are met.**	3-counted elsewhere
Required Engineering Core ▪ IDE 30100 (no substitutions)	1
Engineering Design Selective ▪ Three credits of engineering design. ▪ Must be approved by School of Engineering Education.	3
Elective Engineering Courses ▪ Courses selected by the student with the aid of an adviser. ▪ Must be approved by School of Engineering Education.	26
Minimum Engineering Additional engineering, CS, mathematics or science courses as needed	**30**
Minimum MBSE after FYE Program	**44**
Area ▪ Additional courses selected to satisfy the student's educational objectives. ▪ There is no minimum in the Area since more than 44 credits of MBSE courses may be taken. ▪ A computer aided design (CAD) course is very highly recommended.	
Maximum Area Credits	**29**
Minimum Credits Required for Graduation	**120**
Other Graduation Requirements ▪ All plans of study must be approved by the School of Engineering Education. ▪ An overall Graduation Index of 2.0 or higher and a minimum GPA of 2.0 in the engineering courses at the 20000 level and higher included in the plan of study are required. ▪ All other Purdue University graduation requirements must be satisfied.	

Proposed

Degree Requirements for Bachelor of Science (BS) Degree in Interdisciplinary Engineering Studies

(Not ABET Accredited)

Definition	Credits
First-Year Engineering Program ▪ If the common first-year program in engineering is changed, the BS requirements will be changed to reflect these changes.	29-33
Communications ▪ Com 11400 or equivalent. Must select a course that satisfies the Purdue University Foundational Learning Outcome in Oral Communication, and satisfies 3 credits of the general education program. ▪ Recommendation: take Com 11400 as part of the FYE program.	3 counted in FYE program
English ▪ ENGL 10600 or 10800. Must select a course that satisfies the Purdue University Foundational Learning Outcomes in Information Literacy and in Written Communication. This requirement satisfies 3 or 4 credits of the Engineering general education program. ▪ Recommendation: take ENGL 10600 or 10800 as part of the FYE program.	3 or 4 counted in FYE program
General Education ▪ ~~Follow Engineering's General Education Program requirements.~~ Students must take any course selected for a letter grade and earn a C- or better in order to receive credit for meeting the Foundational Learning Outcomes and this General Education requirement [a unit level requirement]. The P/NP option is not available for this requirement. ▪ A total of at least 24 credits are required - 6 or 7 of these credits for Com and ENGL are counted in the FYE program. The remaining credits must be chosen to satisfy the Purdue University Foundational Learning Outcomes in Humanities, Behavior/Social Science and Science, Technology & Society. ▪ At least 18 credits of the General Education program (including Com and ENGL) must be taken outside of the Colleges of Engineering, Science, and Technology. Courses from the Colleges of Engineering, Science and Technology used in the General Education Program may only be used to satisfy Purdue University Foundational Learning Outcomes in Humanities, Behavior/Social Science and Science, Technology & Society (they cannot be used to add depth or non-technical breadth). If EPICS is used to satisfy the Science, Technology & Society Outcome, three credits of EPICS are required. The engineering (at 20000 and higher level) and science credits used in the General Education program can also be used to satisfy the engineering requirements and MBSE science requirements, respectively , but credits are not double-counted for graduation. ▪ At least 6 credit hours must come from courses at the 30000 level or above, or from courses with a required prerequisite in the same department. ▪ Note: Individual plans of study may recommend particular general education courses.	17-18
Economics Selective ▪ Take ECON 25100, ECON 25200, or IE 34300. ▪ Credits for ECON 25100 or 25200 satisfy Purdue University Foundational Learning Outcomes in Behavior/Social Science and count in the General Education package. ▪ Credits for IE 34300 count in Engineering.	3-6

Definition	Credits
Math, Basic Science and Engineering (MBSE) ▪ Required sophomore mathematics. ▪ Multivariate calculus (MA 26100), and linear algebra & differential equations, MA 26200 or (MA 26500 & 26600), or equivalent.	8-10
Sophomore Science Selective ▪ ENE approved selective. (May not be the same course used as FYE Science Selective)	3-4
Statistics Selective ▪ ENE approved statistics course from the Department of Statistics or approved engineering statistics course. The engineering courses count towards the required 30 credits in engineering. Statistics courses count towards the MBSE requirements. ▪ Engineering: Minimum 30 credits at 20000+ level, of which at least 15 credits are at 30000 + level. Maximum number of credits in any one engineering discipline is 24. ▪ **Note: It is the student's responsibility to see that all prerequisites are met.**	3-counted elsewhere
Required Engineering Core ▪ IDE 30100 (no substitutions)	1
Engineering Design Selective ▪ Three credits of engineering design. ▪ Must be approved by School of Engineering Education.	3
Elective Engineering Courses ▪ Courses selected by the student with the aid of an adviser. ▪ Must be approved by School of Engineering Education.	26
Minimum Engineering Additional engineering, CS, mathematics or science courses as needed	**30**
Minimum MBSE after FYE Program	**44**
Area ▪ Additional courses selected to satisfy the student's educational objectives. ▪ There is no minimum in the Area since more than 44 credits of MBSE courses may be taken. ▪ A computer aided design (CAD) course is very highly recommended.	
Maximum Area Credits	**29**
Minimum Credits Required for Graduation	**120**
Other Graduation Requirements ▪ All plans of study must be approved by the School of Engineering Education. ▪ Courses selected for use on the approved plan of study must be taken for a letter grade. Students must take any course selected for a letter grade and earn a C- or better in order to receive credit for meeting degree requirements [a unit level requirement]. The P/NP option is not available for any course taken as part of degree requirements. ▪ An overall Graduation Index of 2.0 or higher and a minimum GPA of 2.0 in the engineering courses at the 20000 level and higher included in the plan of study are required. ▪ All other Purdue University graduation requirements must be satisfied.	

PURDUE
UNIVERSITY

SCHOOL OF ENGINEERING EDUCATION

January 16, 2018

TO: Eckhard Groll, Associate Dean for Undergraduate and Graduate Education, the Engineering Curriculum Committee (ECC), and the Faculty of the College of Engineering

RE: Fast-Track Action on EFD 70-16

I am writing to request a "Fast-Track" action by ECC to amend **EFD 70-16: Change to FYE Requirements to update the name of GS 1000 and GS 10100 to ENGL 11000 and ENGL 11100 respectively**.

The revised wording is shown below with the amendment indicated in red.

Rationale:
GS 10000 and GS 10100 are currently part of the FYE plan of study requirements. Beginning Fall 2017, GS 10000 and GS 10100 became ENGL 11000 and ENGL 11100 (same courses, just different prefix identifiers). The FYE plan of study requirements need to be updated to reflect these changes in the name of the two courses and legitimately recognize them as part of the FYE plan of study requirements. The courses with the new names are already published in the Purdue catalog (see additional information at the end)

Proposed Amendment to EFD 70-16 (in red):

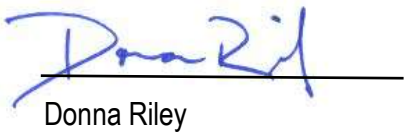
Proposed requirements: (starting on Fall 2017)

I. Courses: To complete FYE and be eligible for consideration for entry into an Engineering degree program, a student must complete the following courses:

1. ENGR 13100, ENGR 14100, or (EPCS 11100 **and** EPCS 12100)
2. ENGR 13200, ENGR 14200, or ENGR 13300
3. MA 16100 or MA 16500
4. MA 16200, MA 16600, or MA 17300
5. CHM 11500 or [CHM 11100 **and** CHM 11200]
6. PHYS 17200
7. A science selective course, chosen from:
    a. CHM 11600
    b. CS 15900
    c. BIOL 11000
    d. BIOL 11100
    e. BIOL 13100
    f. BIOL 12100 **and** BIOL 13500
    g. ENGR 14100 and ENGR 14200 for students who entered Purdue prior to Fall 2017 only

Neil Armstrong Hall of Engineering, Room 1300 ■ 701 W. Stadium Avenue ■ West Lafayette, IN 47907-2045
Department Phone: (765) 494-9713 ■ FAX: (765) 494-5819

8. Two of the following four courses:
    a. A course that meets the Written Communication foundational outcome (typically ENGL 10600 or ENGL 10800)
    b. A course that meets the Oral Communication foundational outcome (typically COM 11400)
    c. ENGL11000 (former GS10000, this option is available only for students who have a TOEFL score in their student record).
    d. ENGL11100 (former GS10100, this option is available only for students who have a TOEFL score in their student record).



Donna Riley
Kamyar Haghighi Head, School of Engineering Education
Professor of Engineering Education

Additional information from the Purdue Catalog, retrieved on January 16th, 2018

Catalog Entries

Fall 2016
Jan 16, 2018

Select the Course Number to get further detail on the course. Select the desired Schedule Type to find available classes for the course. The Schedule Type links will be available only when the schedule of classes is available for the selected term.

GS 10000 - American Language And Culture For International Students I

Credit Hours: 3.00. This course examines the dynamic nature of contemporary U.S. culture, with attention given to uses of English language in social and academic contexts. Students will improve their reading, writing, and speaking abilities in Englilsh so that they can actively participate in social and academic communication. Typically offered Fall Spring.
3.000 Credit hours

Syllabus Available
Levels: Graduate, Professional, Undergraduate
Schedule Types: Distance Learning, Lecture

Offered By: College of Liberal Arts
Department: General Studies

Course Attributes:
Lower Division, GTC-Humanistic-Artistic, UC-Humanities

May be offered at any of the following campuses:
West Lafayette

Learning Outcomes: 1. Increase understanding of American culture, especially in comparison to students' own cultural experiences. 2. Develop effective communication skills and strategies for the college classroom and beyond. 3. Improve English language skills: reading efficiency, writing skills, presentatiion skills, and spoken English ability. **General Requirements:**
(TIBT .00 to 100.00
May not be taken concurrently. **)**
or
(ILT2 .00 to 7.50

GS 10100 - American Language And Culture For International Students II

Credit Hours: 3.00. The course takes a social science-based approach to investigating the American university by examining contemporary college life, the history of the American academy, social and environmental issues on campus, and opportunities for engagement with the wider community. Students will improve their speaking, listening, reading, writing skills in English so that they can actively participate in social and academic communication. Typically offered Fall Spring Summer.
3.000 Credit hours

Syllabus Available
Levels: Graduate, Professional, Undergraduate
Schedule Types: Distance Learning, Lecture

Offered By: College of Liberal Arts
Department: General Studies

Course Attributes:

Lower Division

May be offered at any of the following campuses:
West Lafayette Continuing Ed
West Lafayette

Learning Outcomes: 1. Increase understanding of American academic culture, especially in comparison to students' own cultural experiences. 2. Develop effective communication skills and strategies for the college classroom and beyond. 3. Improve English language proficiency, especially speaking and listening and presentation skills. **Prerequisites:** Undergraduate level GS 10000 Minimum Grade of D-

ENGL 11000 - American Language And Culture For International Students I

Credit Hours: 3.00. The course takes a social science-based approach to investigating the American university by examining contemporary college life, the history of the American academy, social and environmental issues on campus, and opportunities for engagement with the wider community. Students will improve their speaking, listening, reading, writing skills in English so that they can actively participate in social and academic communication. Typically offered Fall Spring Summer.
3.000 Credit hours

Syllabus Available
Levels: Graduate, Professional, Undergraduate
Schedule Types: Distance Learning, Lecture

Offered By: College of Liberal Arts
Department: English

Course Attributes:
Lower Division, GTC-Humanistic-Artistic, UC-Humanities

May be offered at any of the following campuses:
West Lafayette

Learning Outcomes: 1. Speak English more fluently. 2. Read English more fluently. 3. Communicate in English with increased clarity (writing effective academic sentences and paragraphs; speaking on familiar topics). 4. Develop and apply a process for cross-cultural comparison and reflection. **General Requirements:**
(TIBT .00 to 100.00
May not be taken concurrently. **)**
or
(ILT2 .00 to 7.50
May not be taken concurrently. **)**

ENGL 11100 - American Language And Culture For International Students II

Credit Hours: 3.00. Students will continue to develop the foundational language skills and knowledge that they need to succeed in their other classes at Purdue and to prepare for further academic and professional opportunities. Students will also deepen their understanding of American culture and improve their ability to think about cultural differences in positive ways. In a sense, this class will be a bridge to help you transition to other language-intensive courses at Purdue where you need to read, write, and speak frequently and/or work in groups (such as business, engineering, literature, public speaking, and social sciences). Typically offered Fall Spring Summer.
3.000 Credit hours

Syllabus Available
Levels: Graduate, Professional, Undergraduate
Schedule Types: Distance Learning, Lecture

Offered By: College of Liberal Arts
Department: English

Course Attributes:
Lower Division

May be offered at any of the following campuses:
West Lafayette

Learning Outcomes: 1. Speak and read English more fluently. 2. Present academic topics to an audience with increased clarity and within time constraints (write effective, short academic essays; present information orally to an academic audience). 3. Understand reasons and practices for using outside sources in an American academic context. **Prerequisites:**
Undergraduate level ENGL 11000 Minimum Grade of D- or Undergraduate level GS 10000 Minimum Grade of D-