

**Paper and Chemical Engineering  
Student Handbook**

**2009-2010**

September 2009

Dear Student,

On behalf of the faculty and staff, I welcome you to the Department of Paper and Chemical Engineering. We have put together for you information which should be of great value to you. I hope you will carefully read the mission, vision and value statement and reflect upon it.

Information on program objectives and program learning outcomes, engineering licensure, advising, co-op/internship opportunities, scholarship opportunities should be of interest to you. From my personal experience, a successful student meets with advisor regularly, seeks his/her advice, and plans the course selection and career path in a most judicious manner.

I also encourage you to be involved with various student organizations in the Department. Your participation in AICHE, TAPPI, SAC and other professional organizations will provide you with opportunities to learn about the profession and prepare for the leadership role.

We have a full-fledged industry co-op program available to our students. Co-op work experience is very valuable in identifying the career area of most interest to the student. It also is viewed as the kind of experience essential in obtaining permanent placement by many corporate recruiters. Therefore, I strongly recommend that you consider co-op opportunities during your course of studies. You may consider internship opportunities in the summer or may choose to spend the fall semester of senior year working in industry on a co-op, which will not cause out-of-sequence course issues.

Programs for doing undergraduate research under the supervision of faculty are also available. The Department also offers a five year combined B.S. and M.S. program that you may wish to consider.

Increasingly it has become important to gain international experience as the engineering profession has assumed global dimensions. We can provide access to learning environments to our students in Finland, China, India and Poland. As you are also aware that Miami has a campus in Luxemburg where you may choose to spend a semester. Please consult your advisor regarding study abroad opportunities.

In addition to the University graduation requirements, every student enrolled in chemical engineering and paper science and engineering academic programs offered by the Department is required to take the Fundamentals of Engineering Exam and to make a "good faith" effort to pass the exam. Passing of the FE Exam is only the first step towards obtaining engineering licensure.

I will be happy to provide any additional information that you may need.

Sincerely,

A handwritten signature in black ink that reads "Shashi B. Lalvani". The signature is written in a cursive style and is underlined with a single horizontal stroke.

Shashi B. Lalvani  
Chair and Professor

## Table of Contents

### 2009-2010

<b>Letter from the Chair.....</b>	<b>1</b>
<b>Important Registration Dates.....</b>	<b>3</b>
<b>Introduction .....</b>	<b>5</b>
<b>Program Mission, Objectives and Outcomes.....</b>	<b>6</b>
<b>Overview of ABET Accreditation.....</b>	<b>9</b>
<b>Licensure for Engineers .....</b>	<b>10</b>
<b>Academic Advising.....</b>	<b>11</b>
<b>Curriculum for department majors and minor.....</b>	<b>13</b>
<b>Guidelines for Student Petitions.....</b>	<b>17</b>
<b>Laboratory Safety Policies and Requirements.....</b>	<b>18</b>
<b>Cooperative Education.....</b>	<b>19</b>
<b>Student Professional Organizations.....</b>	<b>20</b>
<b>Paper Science and Engineering Foundation.....</b>	<b>21</b>
<b>APPENDIX.....</b>	<b>23</b>
<b>Course Descriptions.....</b>	<b>25</b>
<b>Professors and Graduate student contact information.....</b>	<b>27</b>
<b>Student Petition example .....</b>	<b>28</b>
<b>Advisor List.....</b>	<b>29</b>
<b>Chemical Engineering Major Curriculum .....</b>	
<b>2009-2010.....</b>	<b>36</b>
<b>Paper Science and Engineering Curriculum.....</b>	
<b>2009-2010.....</b>	<b>44</b>
<b>Engineering Management Curriculum.....</b>	
<b>2009-2010.....</b>	<b>48</b>
<b>EGM- Paper Science.....</b>	
<b>EGM- Environmental Engineering.....</b>	
<b>Double Major: Chemical Engineering and Paper Science and Engineering.....</b>	<b>54</b>
<b>Chemical Engineering Minor Curriculum.....</b>	<b>55</b>
<b>Paper Science and Engineering Minor Curriculum.....</b>	<b>56</b>

## Important registration and advising dates: 2009-2010

Month	Day	Day	Event
August	20	Thursday	Late Registration for Fall Semester for students not registered in advance
	21	Friday	University Convocation, 9 a.m.
	24	Monday	Classes begin at 8 a.m.
	28	Friday	Registration/change of Schedule through BannerWeb ends at 11:59 pm.
September	7	Monday	Labor Day (no classes-campus closed)
	14	Monday	Last day to drop fall semester course without a grade  Credit/no-credit deadline
October	13	Tuesday	Midterm grades available on BannerWeb at noon
	16-18	Fri – Sun.	Fall Term break
	30	Friday	Last day to withdraw from a fall semester  Last day to change course to/from audit
November	24	Tuesday	Thanksgiving Holiday begins at 10 p.m.
	25	Wednesday	Thanksgiving Holiday (no classes; campuses open)
	26-29	Thurs. – Sun.	Thanksgiving Holiday (campuses closed)
December	11	Friday	Classes end on Oxford campus
	14	Monday	Final examinations begin
	18	Friday	Final examinations end December commencement
	24-31	Thurs-Thurs.	Winter Break – University Closed
January	1	Friday	Winter Break – University Closed
	8	Friday	Late Registration for Spring Semester for students not registered in advance
	11	Monday	Classes begin 8 a.m.
	15	Friday	Registration/change of schedule through BannerWeb ends at 11:59 p.m.
	18	Monday	Martin Luther King Day (no classes, campuses closed)
February	1	Monday	Last day to drop spring semester course without a grade  Credit/no-credit deadline

	15	Monday	President's Day (classes in session)
March	7-14	Sun.-Sun.	Spring Break
	9	Tuesday	Midterm grades available on BannerWeb at noon.
	25	Monday	Last day to withdraw from a spring semester course with a grade of W.  Last day to change course to/from audit
April	30	Friday	Classes end
May	3	Monday	Final examinations begin
	7	Friday	Final examinations end
	8-9	Saturday – Sunday	Commencement Weekend

# **Introduction to the Paper and Chemical Engineering Student Handbook**

**(Edition Fall 2009)**

This Handbook provides important information concerning PCE Department policies, regulations, and practices pertinent to students. It also contains information needed by students for advanced course registration.

It is expected that this handbook could be improved further and student feedback is encouraged. Please communicate your suggestions directly to any Paper and Chemical Engineering faculty member or to Mrs. Guest in the PCE Department Office.

## **Engineering Code of Ethics**

All members of the Paper and Chemical Engineering Department should adhere to the highest ethical standards in all professional and personal matters. To this end, the faculty endorses the following Code of Ethics for Engineers proposed by the National Society of Professional Engineers.\*

### **Preamble**

*Engineering is an important and learned profession. The members of the profession recognize that their work has a direct and vital impact on the quality of life for all people. Accordingly, the services provided by engineers require honesty, impartiality, fairness, and equity, and must be dedicated to the protection of the public health, safety and welfare. In the practice of their profession, engineers must perform under a standard of professional behavior, which requires adherence to the highest principles of ethical conduct on behalf of the public, clients, employers, and the profession.*

### **Fundamental Canons**

Engineers, in the fulfillment of their professional duties, shall:

- Hold paramount the safety, health and welfare of the public in the performance of their professional duties.
- Perform services only in areas of their competence.
- Issue public statements only in an objective and truthful manner.
- Act in professional matters for each employer or client as faithful agents or trustees.
- Avoid deceptive acts in the solicitation of professional employment.

\*For additional statements about ethical business practices, please see the company codes of business conduct on file in the Paper and Chemical Engineering Office.

## **Paper and Chemical Engineering Mission, Program Objectives, and Program Learning Outcomes**

The mission of the Paper and Chemical Engineering Department is:

*To teach and prepare liberally educated, articulate, and skilled engineers for leadership positions in the chemical, biochemical, environmental, pulp and paper and other industries. A major role will be to serve as a critical resource to inform society about the processes related to production and uses of chemicals, drugs, fuels, materials and paper. A central objective is to develop new knowledge about engineering and scientific fundamentals that focus on energy efficient manufacturing as well as sustainability and environmental management.*

The department accomplishes the above mission through achievement of four program objectives. Each of these objectives has a set of student-focused learning outcomes associated with it. The following table summarizes these relationships.

### **Objectives (Chemical Engineering)**

*Objective 1. The graduate will have and apply the technical knowledge, skills and expertise required of a process engineer to achieve practical solutions to problems in the chemical industry or for a company allied to the chemical industry. The graduate will serve the needs of biochemical, environmental and paper industries.*

*Objective 2. The graduate will have the organizational, leadership, and general communication skills needed by professionals at the entry-level and beyond.*

*Objective 3. The graduate will have the key personal attributes desirable in an engineer and use these attributes to learn and develop.*

*Objective 4. The graduate will have life-long learning skills, which will allow successful adaptation to the changing environment and evolving technologies throughout their professional career.*

*Objective 5. The major will have sound grounding in engineering, sciences, and liberal education, which will facilitate successful pursuit of graduate studies in Engineering or other professional degrees, such as Business, Law and Medicine.*

### **Outcomes (Chemical Engineering)**

- A.** Ability to apply knowledge of mathematics, science and engineering.
- B.** Ability to design and conduct experiments, as well as to analyze and interpret data.
- C.** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
- D.** Ability to function on multidisciplinary teams.
- E.** Ability to identify, formulate, and solve engineering problems.

- F. Understanding of professional and ethical responsibility.
  - G. Ability to communicate effectively.
  - H. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
  - I. Recognition of the need for, and an ability to engage in life-long learning.
  - J. Knowledge of contemporary issues.
  - K. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- 

### **Objectives (Paper Science and Engineering)**

*Objective 1. The graduate will have and apply the technical knowledge, skills and expertise required of a process engineer to achieve practical solutions to problems in the paper industry or for a company allied to the paper industry.*

*Objective 2. The graduate will have the organizational, leadership, and general communication skills needed by professionals at the entry-level and beyond.*

*Objective 3. The graduate will have the key personal attributes desirable in an engineer and use these attributes to learn and develop.*

### **Outcomes (Paper Science and Engineering)**

- A. Ability to apply knowledge of mathematics, science and engineering.
  - B. Ability to design and conduct experiments, as well as to analyze and interpret data.
  - C. Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
  - D. Ability to function on multidisciplinary teams.
  - E. Ability to identify, formulate, and solve engineering problems.
  - F. Understanding of professional and ethical responsibility.
  - G. Ability to communicate effectively.
  - H. The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
  - I. Recognition of the need for, and an ability to engage in life-long learning.
  - J. Knowledge of contemporary issues.
  - K. Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
-

### **Objectives (Engineering Management: Paper Science Program)**

*Objective 1. Enable a student to gain the technical knowledge, skills and talents required to achieve practical solutions to challenges in paper industry or for a company allied to the paper industry.*

*Objective 2. Enable a student to develop the organizational, leadership, and general communication skills needed by professionals at the entry-level and beyond.*

*Objective 3. Promote the development of key personal attributes desirable in an engineering graduate.*

### **Outcomes (Engineering Management: Paper Science)**

- A.** Ability to apply knowledge of mathematics, science and engineering.
  - B.** Ability to design and conduct experiments, as well as to analyze and interpret data.
  - C.** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
  - D.** Ability to function on multidisciplinary teams.
  - E.** Ability to identify, formulate, and solve engineering problems.
  - F.** Understanding of professional and ethical responsibility.
  - G.** Ability to communicate effectively.
  - H.** The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
  - I.** Recognition of the need for, and an ability to engage in life-long learning.
  - J.** Knowledge of contemporary issues.
  - K.** Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- 

### **Objectives (Engineering Management: Environmental Engineering Program)**

*Objective 1. Enable a student to gain the technical knowledge, skills, and talents required of an environmental engineer to achieve practical and economical solutions to environmental challenges pertaining to industry and society.*

*Objective 2. Enable a student to develop the organizational, leadership, and general communication skills needed by professionals at the entry-level and beyond.*

*Objective 3. Promote the development of key personal attributes desirable in an engineering graduate.*

## **Outcomes (Engineering Management: Environmental Engineering)**

- A.** Ability to apply knowledge of mathematics, science and engineering.
  - B.** Ability to design and conduct experiments, as well as to analyze and interpret data.
  - C.** Ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability.
  - D.** Ability to function on multidisciplinary teams.
  - E.** Ability to identify, formulate, and solve engineering problems.
  - F.** Understanding of professional and ethical responsibility.
  - G.** Ability to communicate effectively.
  - H.** The broad education necessary to understand the impact of engineering solutions in a global, economic, environmental and societal context.
  - I.** Recognition of the need for, and an ability to engage in life-long learning.
  - J.** Knowledge of contemporary issues.
  - K.** Ability to use the techniques, skills, and modern engineering tools necessary for engineering practice.
- 

The learning outcomes listed in the above table are fully in alignment with the outcomes defined by the Accreditation Board for Engineering and Technology (ABET).

### **Overview of ABET Accreditation**

What is ABET? -- ABET stands for Accreditation Board for Engineering and Technology. It is the primary organization responsible for monitoring, evaluating, and certifying the quality of engineering, engineering technology, and engineering related education in the US. ABET is a federation of 29 technical and professional societies representing more than 1.8 million practicing engineering professionals.

The principal objectives of accreditation are to:

1. Assure that graduates of an accredited program are adequately prepared to enter and continue the practice of engineering;
2. Stimulate the improvement of engineering education;
3. Encourage new and innovative approaches to engineering education and its assessment.
4. Identify these programs to the public.

### Advantages of accreditation to the student and the Paper and Chemical Engineering Department

Accreditation benefits the Paper and Chemical Engineering department and its students in the following ways.

## Accreditation:

1. Provides a smooth path to the professional engineering license for graduates of the program.
2. Provides better placement opportunities for graduates.
3. Provides an external viewpoint for program assessment and improvement
4. Motivates the faculty to focus on quality improvement and the acquisition of resources needed to achieve excellence
5. Clearly identifies the program of study as an engineering program.

### Student responsibilities related to ABET accreditation

Students of the Paper and Chemical Engineering Department have several important responsibilities related to ABET accreditation. First, students prepare course notebooks for every course in their program during a year prior to an accreditation visit. These notebooks are reviewed by the ABET Visiting Team and constitute a very important part of the department's documentation for the visit.

Second, students participate actively in the assessment feedback endeavors of the Department by completing course evaluations, participating on the Paper and Chemical Engineering Student Advisory Council, and informing the department Chair promptly about areas that need improvement.

Third, every student is expected to become closely familiar with the ABET design process and how it relates to the activities of a process engineer.

Fourth, students meet with ABET Reviewers during the on-site accreditation visit to discuss various aspects of the program and their experiences in the program.

### **Licensure for Engineers**

We recommend that every student make an honest attempt to become licensed as a professional engineer (P.E.). Licensure is not only a mark of a professional; it also demonstrates that you have accomplished a recognized standard. In many instances especially pertaining to protection of public health, safety and welfare, engineers are required to obtain P.E. license. Each state has slightly varying criteria for licensure. Please refer to the National Council of Examiners for Engineering and Surveying for more information, ([www.ncees.org/licensure\\_for\\_engineers/](http://www.ncees.org/licensure_for_engineers/)). One of the first exams in obtaining licensure is the Fundamentals of Engineering. All students enrolled in chemical engineering, and paper science and engineering programs offered by the Department are required to take this exam and make a “good faith” attempt to pass the exam. Once you pass the exam, you are classified as an intern, also known as an Engineering-in-Training (E.I.T.).

## Academic Advising

### Purpose of academic advising

A primary goal of the Paper and Chemical Engineering Department is to *insure that all Paper and Chemical Engineering students progress through the academic program in its intended course sequence while meeting all grade prerequisite requirements*. The departmental academic advising system is the principal mechanism through which this goal is achieved. Successful academic advising is the result of cooperative efforts from both students and faculty. The following information is intended to assist students as they participate in this important activity.

The following table lists the most important topics that should be covered in advising sessions. Note that first year students have different needs than students who are in their second year and beyond. Of the many topics listed in the table, advanced registration will probably be the most important activity undertaken. It occurs every semester and represents the central function, while the other topics in the table have more supporting roles. Because of this, registration information occupies a substantial portion of this manual.

You must meet with your academic advisor every semester prior to advance registration in order to discuss the courses your plan to take the next semester. At the conclusion of the meeting, your advisor will fill out a Paper and Chemical Engineering Advanced Registration Course Selection Form for you and sign it. You will be given a copy and the original will be placed in your file.

### **Topics that should be addressed in academic advising sessions**

#### First year students:

- Study habit advising
- Curriculum structure and prerequisite flow reinforcement
- "C or better" grade rules enforcement; retaking mathematics and chemistry courses
- Credit/no credit rules
- Advanced registration decisions
- DARS\* form interpretation
- Miami Plan and the PCE curriculum
- Course drop deadline dates
- Methodology for prioritizing course selections in the BANNERWEB system
- Need to obtain advisor's signature on a completed registration advising form at the conclusion of every academic advising session.

## Second year students and beyond

- "C or better" grade rules enforcement advising
- Course prerequisite enforcement advising
- Credit/no credit rules
- Advanced registration decisions
- Miami Plan and the PCE curriculum
- Course substitution administration\*\*
- Academic petition preparation
- Need to obtain advisor's signature on a completed registration advising form at the conclusion of every academic advising session.

\* DARS = Degree Audit Record System

\*\* Students may petition course substitutions or the waiver of course requirements in special cases.

## Roles and responsibilities of the Academic Advisor and the Student

Your academic advisor provides support and guidance to you in your academic decision-making as you go through your course of study. The advisor should be knowledgeable about all of the topics listed in the above table. Your advisor also will assist you in the preparation of petitions pertaining to academic matters, and must sign them before they can be submitted to the department Petition Committee.

You are responsible for scheduling advising meetings at least once each semester prior to advanced registration for the next semester in order to discuss your course schedule plans. You must prepare for these meetings by knowing which courses you need to take, when they are offered, which sections you wish to elect, and whether or not you meet the prerequisite requirements for each course. If you do not meet the prerequisite requirements, then you must be prepared to suggest alternative solutions to this problem, such as course substitutions, or waiving prerequisite requirements. If it becomes clear that a petition to the faculty will be required, then you are responsible for preparing as a good draft of the document as you can, and then bringing it to your advisor for final revision and submission. **This all must take place during the semester prior to the semester in which you plan to take the course or courses in question.**

## **Academic advisor assignments, as of the fall semester, 2009-2010 (see Appendix)**

### What back-up information do I need to prepare for an advanced registration advising session?

When asked this question, experienced students indicated that the following key backup materials are needed when preparing for an advising session. These materials can be found in the pages immediately following this one.

1. Recommended course sequences for the BS Engineering in Chemical Engineering, BS in Paper Science and Engineering and BS in Engineering Management degree programs

2. A table that indicates which semester, or semesters, a given course is offered.
3. The course flow chart that indicates prerequisite requirements in the Paper and Chemical Engineering programs.
4. A description of the alternate course sequences a coop student can follow without having scheduling problems
5. A copy of the Paper and Chemical Engineering Advanced Registration Course Selection Form.
6. A copy of your latest DARS report.

You can review your DARS anytime; anywhere that Internet access is available. Login to review your DARS at <http://bannerweb.muohio.edu/> Your User ID is your University Login. As explained on the web page, the default PIN is your birth date in the format MMDDYY, unless you have previously changed it

Graduating Seniors: Please check your DARS to determine whether or not it contains any unmet degree requirements that will prevent you from graduating. This document is used to certify completion of degree requirements. Notify your academic advisor immediately if you have areas that are not completed. Print and bring a copy of your DARS with you to advising appointments.

Preparing for Summer and Advanced Registration: The DARS identifies courses and requirements that must be fulfilled for degree completion. This tool will help you plan your schedule for upcoming semesters. Print and bring a copy with you to appointments with your advisor.

## **CURRICULUM**

- Chemical Engineering Major Curriculum for 2009-2010 (Appendix)
- Paper Science and Engineering Curriculum for 2009-2010 (Appendix)
- Engineering Management Paper Science Curriculum for 2009-2010 (Appendix)
- Engineering Management Environmental Engineering Curriculum for 2009-2010 (Appendix)
- Double major: Chemical Engineering & Paper Science and Engineering 2009-2010 (Appendix)
- Chemical Engineering Minor Curriculum (Appendix)
- Paper Engineering Minor Curriculum (Appendix)

## The Miami Plan for Liberal Education

Introduction - Liberal education complements the specialized studies in Paper and Chemical Engineering and provides a broadened context for exploring personal and career choices. Liberal education emphasizes four basic goals that will serve you well in your future:

- Thinking critically
- Understanding contexts
- Engaging with other learners
- Reflecting and acting

Requirements of the Miami Plan All students must complete courses identified as part of the Miami Plan as well as courses in the major. The Miami Plan has two parts: **Foundation** and **Focus**. The **Foundation** requirement is met by taking 36 semester hours of Foundation courses in five different areas (See below.) The Focus requirement is met by a minimum of nine hours in a thematic sequence outside your department of major and a minimum of three hours of a Senior Capstone Experience taken in your senior year. The Field includes courses required by your major and division; it also includes electives. If you choose to declare a minor and complete all the requirements for the minor, it will be posted to your academic record.

The Miami Plan is an expanding liberal education curriculum. Additions to its range of courses or modifications of its requirements may be learned by contacting the Office of Liberal Education, or any divisional advising office..

How students of the department meet the Miami Plan Foundation Course Requirements (36 semester hours) The Foundation Requirement consists of 36 semester hours in five specific areas illustrated in the following table.

### Foundation courses and their specific areas

Area	Category
I. English Composition (6 hours)	
II. Fine Arts, Humanities (12 hours)	A. Fine Arts (3 hours minimum) B. Humanities (3 hours minimum) C. Social Science(3 hours minimum)
III. Cultures (6 hours)	A. United States Culture (3 hours minimum) B. World Cultures (3 hours minimum)
IV. Natural Science (9 hours must include a laboratory course)	A. Biological Sciences (3 hours minimum) B. Physical Science (3 hours minimum)
V. Mathematics, Formal Reasoning, Technology (3 hours)	

Students who follow the suggested course sequence for the will automatically satisfy 21 semester hours of the 36 required Foundation course semester hours. This includes six hours of English composition, three hours of social science, nine of natural science, and three hours of mathematics. This leaves 15 hours of coursework to be selected by the student. Included in this category are six hours of social science and world cultures, and nine hours of fine arts and humanities.

How students meet the Miami Plan Thematic Sequence Requirements Students who follow the suggested course sequence for the BS degree will automatically satisfy the Miami Plan Thematic Sequence requirement because the course sequence CHM 142, 145, 231, 363, 364 defines the Chemistry of Environmental Measurements Thematic Sequence (CHM 1 thematic sequence) or CHM 142, 145, 242, 244, 332 or 423 or 433 defines the Chemistry of Life Processes Thematic Sequence (CHM 2 thematic sequence). You are urged to register for this thematic sequence early in the third year by going to the Chemistry Department Office and completing the necessary form. Dr. Thomas Riechel, Chemistry Department, is the contact person for this thematic sequence.

How students meet the Miami Plan Capstone Course Requirements There are two courses required by the Paper and Chemical Engineering department that are Miami Plan Capstone courses - PCE 471, and 472.

**You must consult with your Paper and Chemical Engineering academic advisor prior to participating in the advanced registration process each semester** — Paper and Chemical Engineering Students are required to meet with their faculty advisor prior to registration each semester and have their selected course plan reviewed. Prerequisites and grades will be checked to confirm you meet the requirements for the courses you plan to take. All petition and/or remedial action issues should be addressed at this time. **Students failing to meet with their faculty advisor prior to advanced registration in a given semester will not be allowed to petition the faculty for exceptions to prerequisite and/or grade requirements during the ensuing semester.**

**You must obtain your advisor's signature on your completed Paper and Chemical Engineering Advanced Registration course selection form each semester.**

### **Prerequisite Course Grade Requirements**

(1) A student must earn a grade of C or better in MTH 151 (or the equivalent MTH course) before enrolling in MTH 251. Note: This is a Mathematics Department requirement.

(2) A student must earn a grade of C or better in CHM142 in order to enroll in PCE 204 Material and Energy Balances. If the student is following the suggested course of study, this they must enroll in PHY 181 concurrently. **Note a grade of “C” or better is required before enrolling in PCE 311 (Units Operations Lab I)**

(3) Students must pass MTH 251, PHY 181, and PCE 219 or MME 211, prior to enrollment in PCE 313, Fluid Mechanics.

(4) A student must earn a grade in PCE 313, Fluid Mechanics, and PCE 314, Engineering Thermodynamics, and MTH 245 before enrolling in PCE 403 Heat Transfer. **A grade of C or better must be earned in PCE 204** before enrolling in PCE 414, Mass Transfer. Finally, a student must pass PCE 313, PCE 314 and MTH 245 before enrolling in PCE 482 Process Control.

What courses should a student have completed prior to enrolling in PCE 471 Engineering Design? A student majoring in Paper Science and Engineering should have passed the following courses before enrolling in PCE 471 Engineering Design.

Senior standing is defined as having completed:

- PCE 311 or 451 Unit Operations Lab
- PCE 313 Fluids
- PCE 314 Engineering Thermodynamics
- PCE 341 Engineering Economics

### **Paper and Chemical Engineering Department Academic Regulations**

Paper and Chemical Engineering academic requirements and regulations are explained in the following paragraphs. Students should become familiar with the contents of this section

**Course Policies** It is your responsibility to preserve all graded tests and homework until after the final course grade is awarded. Sections of tests/homework that have inadvertently, not been graded must be identified at the end of the class period in which the test/homework is handed back to the class. Any other grievance with the grading of test/homework has to be brought to the attention of the instructor by 5:00 pm of the second working day after the graded test/homework is handed back to the class.

**Graduation Requirements** A student must attain a minimum 2.0 average for required Paper and Chemical Engineering courses. A 2.0 average is also required in all courses taken at Miami University. Every student enrolled in the academic programs offered by the Department is required to take the Fundamentals of Engineering Exam and make a “good faith” effort to pass the exam.

**Credit/No-Credit Policy** The courses in engineering, chemistry, physics, mathematics, statistics, systems analysis, and English listed as requirements for a degree may not be taken on a credit/ no-credit basis. All Miami Plan courses, maybe taken credit/ no credit.

**Transfer Credit Policy.** To obtain transfer credit for any 300- or 400-level PCE course, you must first receive written departmental approval before enrolling in that course at another college or university. Transfer credit may be obtained for only one engineering

course in the series PCE 204 (Material and Energy Balances), PCE 219 (Statics and Mechanics of Materials), PCE 313 (Fluid Mechanics), PCE 314 (Thermodynamics), PCE 403 (Heat Transfer), and PCE 414 (Mass Transfer).

**Withdrawing from a Course.** According to the Student Handbook, a student may withdraw from a full semester course through the ninth calendar week of the semester. After the end of the ninth week, a student may **not** withdraw from a course unless a petition is approved by the Interdivisional Committee of Advisers. For the full policy see ([www.miami.muohio.edu/documents\\_and\\_policies/handbook/](http://www.miami.muohio.edu/documents_and_policies/handbook/))

### **PCE Department Statement on Academic Conduct**

It is expected that all members of the Paper and Chemical Engineering Department (faculty, staff and students) will adhere to the highest ethical standards in all matters. The Department endorses the Code of Ethics for Engineers proposed by the National Society of professional engineers and strongly defends the rights and responsibilities that accompany academic freedom which are at the heart of the intellectual integrity of Miami University.

It is expected that students will conduct themselves in an ethical fashion, for example, by only possessing and using materials authorized by the instructor during examinations, submitting assignments which are the student's original work (carefully referencing sources of information), protecting the integrity of assignments by adhering to prescribed procedures, and carefully utilizing the University's materials and equipment resources.

Any activity that tends to compromise the academic integrity of the Institution or subvert the educational process is defined as academic misconduct. Cheating and other forms of academic misconduct undermine the value of a Miami education for everyone, especially for the person who cheats.

The PCE Department regards adherence to ethical standards as a very serious issue and will follow all the procedures and penalties for academic misconduct (academic dishonesty) prescribed in Part V of Miami University *Student Handbook*.

### **Guidelines for Paper and Chemical Engineering Student Petitions**

Students occasionally need to submit petitions for faculty consideration. Petition forms are available in the Paper and Chemical Engineering Office. The following guidelines apply. All petitions must bear the signature of a student's academic advisor attesting to the fact that the advisor has been involved in the petition preparation process. Petitions will only be accepted from students who have a completed and signed Paper and Chemical Engineering Registration Advising Form in their file for the semester in question.

Make sure that all relevant background information is included in your petition. Present the basic elements of your request in writing. Do not assume that the people reading your

petition will be able to discern the logic of your argument from a few sentences. Build your case in step-by-step fashion so that there is no doubt or confusion about your request.

The petition must be written in proper English and be addressed to the Chair. No jargon or incomplete sentences should be present. The petition should be prepared on a standard SEAS division petition form. Proofread it carefully to eliminate all errors.

Submit the petition to your academic advisor for review. If your advisor agrees that the petition is well prepared, he will sign it and forward it to the Paper and Chemical Engineering Petition Committee. (Student Petition form)

The department Petition Committee consists of 2-3 Paper and Chemical Engineering faculty members. This subcommittee reviews each petition and brings a recommendation to the entire Paper and Chemical Engineering faculty at the next scheduled faculty meeting. Most commonly, a faculty decision will be taken regarding the petition at that time, and the student will be informed about the decision in writing within 1-2 days. The entire process will require at least 7-10 days. For certain courses petitions need to be approved at the divisional level, which will require more time for action. You must not assume the petition is approved unless you receive confirmation via email or regular mail.

### **Laboratory safety policies and requirements**

It is critical that good safety practices become part of your normal operating mode in order to avoid injury and to develop the safety habits expected by industry. (See earlier statement about engineering ethics and its reference to safety.) To aid you in this endeavor, you will be given a copy of the *Engineering Safety Policies and Requirements* when you enroll in the Paper and Chemical Engineering program. This document provides a complete treatment of the safety guidelines and general procedures adopted by the Department

You must follow safe practices in all Paper and Chemical Engineering laboratories at all times. This is particularly true in laboratories that contain equipment having dangerous, large-scale moving parts, such as the pilot paper machine laboratory; in laboratories where high pressure, high temperature vessels are employed, such as the pulping laboratory; and, in laboratories where dangerous chemicals are used.

***Appropriate safety equipment, such as safety glasses, must be worn at all times in laboratories whenever experimental work is being done***

## **Additional Information Important to Students**

### **Gaining Professional Experience in the Program**

It is very important that you gain practical, professional experience during your career at Miami When you complete your educational experience and begin the process of obtaining a permanent job, you will find that interviewers expect students to have gained significant professional engineering experience during their career at Miami. This is accomplished primarily through coop assignments and summer internships. You will also obtain personal career advice from other sources, such as career opportunity discussions in Student AIChE and TAPPI organizations, and conversations with practicing engineers (Foundation members, School of Engineering and Applied Science Advisory Council members, guest speakers, summer internship and co-op interviewers). You will also receive professional development advice from your academic advisor. (Most Paper and Chemical Engineering faculty members have significant industry experience.)

### **Cooperative Education**

The Co-op program is designed to give the student actual working experience in the paper industry or an allied industry. The Program is valuable to both the company supplying the Co-op position and the student who participates. Companies obtain technical assistance to complete projects that regular technical personnel may not have had adequate time to fulfill. Students gain practical knowledge that complements the more formal university course work, as well as financial assistance for the work on the job.

Co-op participation is the student's free choice; nonetheless it is very strongly recommended. The student can elect to do an internship for about three months (generally in the summer) or a full-blown co-op consisting of the summer and one semester. Typically, we recommend that students at the minimum do a three-month long internship after their sophomore year. We also strongly encourage students to gain a full co-op experience in the summer and fall after completing their junior year course requirements. The curriculum is designed in such a way that students who elect to do an internship or co-op will not be out of sequence in their class work.

Most positions will be of a technical nature, in either research laboratories or production facilities. Positions can be located in almost any state. Students assigned to positions far from Ohio may be assisted with living costs and the transportation expenses while traveling to and from Oxford.

Admission criteria are based on a successful academic performance at Miami University. Once admitted to the program, the co-op student is periodically evaluated and informed of specific areas where his or her performance can improve. This evaluation is done by both the faculty and industrial supervisor. Program students also carry out periodic evaluation of their co-op positions and the company's use of co-op students.

Students who have accepted a co-op assignment have the responsibility of registering for PCE 320, Professional Practice for each term they are away. This is to avoid course registration problems when they return to full-time student status. They also must keep the department informed of their assignments and change of address, phone, etc.

General procedures for obtaining a co-op job - Students commonly begin their co-op experience no earlier than the summer after their second year at Miami. The process begins with a mandatory first semester meeting between co-op candidates and the Paper and Chemical Engineering Co-op Director. At the meeting, students receive a copy of the *Regulations Governing the Paper and Chemical Engineering Cooperative Education Program*. This document covers such topics as the admission requirements for the program, how co-op positions are assigned (interviews, resumes, time-tables, etc.) There is also information in the Regulations about the different kinds of jobs students take, how their performance is evaluated, registration in PCE 320, and parking permits. (This manual is available for preview in the Paper and Chemical Engineering Office.)

General procedures for obtaining a summer internship - Summer internships assignments are administered through the MU Career Planning and Placement Office (CPPO). The Paper and Chemical Engineering Department posts all communications from the CPPO to students on departmental bulletin boards.

### **Student Professional Organizations**

Student AIChE, TAPPI and Student PIMA A very important part of your professional and leadership development will occur through your participation in student professional organizations. There are three such groups in Paper and Chemical Engineering: Student AIChE (American Institute of Chemical Engineers), TAPPI (Technical Association of the Pulp and Paper Industry) and Student PIMA (Paper Industry Management Association). As their names imply, these organizations are affiliated with national parent organizations comprised of practicing professionals and receive significant support from these organizations. For example, both TAPPI and PIMA have endowed scholarships for Paper and Chemical Engineering students.

At Miami, these student organizations undertake joint programming during the year. Programs are held monthly where industrial speakers are invited to talk about a technical, management, or professional development topic that is relevant to students. The two groups also sponsor a number of social events during the year. Every third year National TAPPI holds its International Exhibit and student chapters from all over the US gather at the event. During years when there is no exhibit, Student TAPPI chapters meet at one of the annual functional conferences. These meetings provide excellent chances for Miami students to get to know their counterparts in other universities and to become acquainted with industry professionals who will eventually become their colleagues after they (the students) graduate.

Other student engineering organizations In addition to the Student AIChE, TAPPI and PIMA groups, other technical organizations that attract Paper and Chemical Engineering

students are: Society of Women Engineers (SWE), Women in Mathematics, Science, and Engineering (WIMSE) and the Society of Manufacturing Engineers (SME). The former is a campus-wide organization whose meetings are publicized broadly. The Mechanical and Manufacturing Engineering Department (MME) sponsors SME and you learn about its activities by visiting the MME offices and reading their bulletin boards.

### **Paper Science and Engineering Foundation**

Paper and Chemical Engineering students receive very strong industrial support. One of the primary examples of this support is the scholarship program sponsored by the Paper Science and Engineering Foundation. The Paper Science and Engineering Foundation is a non-profit organization established specifically to provide industry support to students in the Paper and Chemical Engineering program. Its 32 members represent a broad range of interests in the paper industry, including manufacturers, suppliers, distributors, and converters. The purpose is to help provide a continuing supply of technically and managerially trained men and women, who are well-versed in Paper and Chemical Engineering, to meet the requirements of the industry's continually advancing technology.

Paper Science and Engineering Foundation Scholarships - Each year, the Foundation awards scholarships to Paper and Chemical Engineering students who meet specific grade point average and other criteria. Additional awards, including special assistance for out-of-state students, are also available to qualified students. The Paper Science and Engineering Foundation scholarship program has been an important part of the program for the past 40 years, and over \$1.5 million has been awarded to students. Approximately one-half of all Paper and Chemical Engineering graduates have received scholarship support. Please contact Mrs. Crist, Business Coordinator, [crisctcl@muohio.edu](mailto:crisctcl@muohio.edu), for further information about scholarships.

Other interactions between students and the Foundation - The Foundation holds its Annual Meeting in the spring of each year. During this event students have multiple opportunities to interact with company representatives. For example, all students are invited to the annual Scholarship Awards Banquet held during the meeting. Students also make project presentations to the Foundation as part of their senior capstone engineering design experience.

Miami University  
Paper Science and Engineering Foundation  
64B Engineering Building  
Oxford, Ohio 45056  
(513)-529-0780

### **SCHOLARSHIP GUIDELINES**

<http://www.eas.muohio.edu/psf/eligibility.html>



# Appendix



**PAPER AND CHEMICAL ENGINEERING - COURSE DESCRIPTIONS - 2009-2010**  
**SCHOOL OF ENGINEERING & APPLIED SCIENCE - MIAMI UNIVERSITY**

**EAS 101 COMPUTING, ENGINEERING & SOCIETY (1)** Introduces computing and engineering professions and their role in society. Explores different engineering and computing disciplines, examines ethical and societal issues related to the disciplines and their impact on the world. An active forum for discussion of ideas and issues.

**EAS 102 PROBLEM SOLVING AND DESIGN (3)** This course introduces an approach to problem solving for computing and engineering students. The students will learn systematic approaches to problem solving. Topics covered include: problem identification, analyzing requirements, research existing and alternative solutions, analyzing solutions quantitatively, synthesizing and evaluating data, prototyping, and testing. Students will also develop their oral and written skills for technical communications. Co-requisite: EAS 101, MTH 151.

**PCE 201 PRINCIPLES OF PULP AND PAPER(3)** Introduction to the pulping and papermaking. Carry out experiments in paper science. Apply engineering skills to problem solving related to paper and allied industries. Prerequisite: CHM 141 or instructor approval.

**PCE 202 PULP AND PAPER PHYSICS (3)** Discovery of how pulping, papermaking and converting are utilized to develop required performance properties of products from paper. Conduct laboratory investigations to determine properties of paper made in the laboratory and from the pilot paper machine. Prerequisite: PCE 201 and a grade of C or better in PHY 181 and one of the following: i) PCE 219 or ii) MME 211.

**PCE 204 MATERIAL AND ENERGY BALANCES (3)** Techniques used to calculate material and energy balances with special emphasis on paper industry applications. Prerequisite: grade of C or better in CHM 142. Co-requisite: PHY 181.

**PCE 219 STATICS AND MECHANICS OF MATERIALS (3)** This course provides an introduction to the fundamentals of the mechanics of materials for engineering students in Electrical, Chemical, and Paper Engineering. The course stresses statics, mechanics of deformable media, and material behavior. Elements of dynamics, elasticity, and viscoelasticity will be covered. The central theme of the course that binds these subjects together is proper problem formulation in terms of kinematics, constitutive behavior, equilibrium, and compatibility. Prerequisite: EAS 102. Co-requisite: PHY 181.

**PCE 244 INTRODUCTION TO ENVIRONMENTAL ENGINEERING (3)** Introductory design concepts for the control of water pollution, air pollution, and solid waste will be covered. Environmental legislation will be discussed. Solutions to environmental problems will be investigated, considering technical, economical and ethical aspects of engineering. Prerequisite: CHM 141 or equivalent, MTH 151 or equivalent.

**PCE 301 PULP AND PAPER CHEMISTRY (3)** Wood chemistry, chemical pulping chemistry and processes, and wet end chemistry. Chemical composition and structure of lignocellulosic wood fibers. The unit processes used in chemical pulping and bleaching. Kraft Recovery. Colloidal science of retention, sizing, process and functional additives. Prerequisite: PCE 201 and one of the following: CHM241, or CHM 251, or CHM 231.

**PCE 311 UNIT OPERATIONS LABORATORY I (2)** Laboratory course; students conduct experiments and do computer simulations in the areas of material and energy balances and fluid dynamics. Emphasizes acquisition of knowledge about instrumentation commonly used in process industries. Both oral and written laboratory reports required. Prerequisite: A grade of C or better in PHY 181 and PCE 204. Co-requisite: PCE/MME 313.

**PCE 313 FLUID MECHANICS (3)** Fundamentals and application of the mechanics of fluids including properties, statics and dynamics of fluids, dimensional analysis and similitude, steady state flow, and topics in compressible flow. Prerequisites: MTH 251, PHY 181 and PCE 219 or MME 211. Cross-listed with MME 313.

**PCE 314 ENGINEERING THERMODYNAMICS (3)** Study of the fundamental principles of thermodynamics. Emphasis placed on engineering applications such as power cycles, refrigeration, and heat transfer systems. Prerequisite: MTH 251, PHY 181. Cross-listed with MME 314.

**PCE 320 PROFESSIONAL PRACTICE (0)** Students participating in paper science and engineering co-op program register for this course during semesters when they are away from Oxford on work assignment. This enables students to remain in good standing with the university registrar.

**PCE 341 ENGINEERING ECONOMICS (3)** Engineering economic decisions; break-even and minimum cost analysis; engineering methods of resource allocation; concepts of interest; time evaluation of tactical and strategic alternatives. Prerequisite: ECO 201, MTH 151. Co-requisite: STA 368 or PCE 204. Cross-listed with MME 341.

**PCE 403/503 HEAT TRANSFER (3)** Continued study of unit operations with emphasis on heat transfer. Study of steady and unsteady conduction, and laminar, turbulent, boiling, and condensing convective heat transfer. Radiation heat transfer, heat exchangers, evaporators, and transfer units. Prerequisites: PCE/MME 313, PCE/MME 314 and MTH 245. Cross-listed with MME 403

**PCE404 PAPERMAKING (3)** Contemporary paper manufacturing processes with emphasis on the chemical engineering principles. Prerequisite: PCE 313 and PCE 202. Co-requisite: PCE/MME 341.

**PCE 405/505 INDUSTRIAL ENVIRONMENTAL CONTROL (3)** Survey of environmental issues facing industry and how the industry addresses these issues. In-plant pollution abatement alternatives discussed as well as external treatment. Computer-based modeling applications introduced and applied to problems. Design considerations involved in selecting among alternative pollution control strategies are presented and applied to examples. Prerequisites: PCE/MME 313 and a grade of C or better in PCE 204. Co-requisite: PCE 311.

**PCE 412/512 CHEMICAL ENGINEERING THERMODYNAMICS (3)** Advanced thermodynamics with emphasis in phase and chemical equilibrium; Thermodynamic relations and application, Properties of ideal and non-ideal one-component and multi-component systems; ideal and non-ideal phase equilibria; phase diagrams; design of equilibrium flash separators; phase equilibria using equation of state; chemical equilibrium; optimum conditions for feasible reaction equilibria. Prerequisite: PCE/MME 314.

**PCE414/514 MASS TRANSFER (3)** Continued study of unit operations, with emphasis on mass transfer and special problems. Steady and unsteady diffusion, convective mass transfer, absorption, scrubbing, and stripping. Humidification, psychrometry, and drying. Multiple effect evaporators, cooling towers, packed towers, and distillation. Prerequisite: PCE/MME 313, PCE/MME 314 and MTH 245, and a grade of C or better in PCE 204.

**PCE 415/515 (3) CHEMICAL KINETICS & REACTOR DESIGN**

Chemical Kinetics of homogeneous and heterogeneous reactions, kinetic theories, mechanism and modeling, reactor design, design of multiple reactions; temperature and pressure effects. Non-ideal reactors, survey of catalytic and biochemical reaction systems. Prerequisites: PCE/MME 313, 314, MTH 245, and a grade of C or better in PCE 204.

**PCE 416 BIOCHEMICAL ENGINEERING (3)** this course is an introduction to the fundamental concepts concerning biochemical kinetics and bioreactors. In particular, this course will focus on enzymatic reactions and fermentations using genetically engineered organisms. Biochemical topics include overviews of cell structure, enzyme kinetics and cell growth kinetics. Engineering topics include: immobilization, fermentor design and sterilization processes. Prerequisites: MTH 245, CHM 332 or CHM 432, PCE 415 and a grade of C or better in PCE 204 or by permission of the instructor

**PCE/MPC 417 BIOMEDICAL ENGINEERING (3)**

This course is an introduction to the fundamental concepts in biomedical engineering with a special focus on chemical engineering applications. In particular, this course will focus on transport phenomena in biological systems, pharmacokinetics and tissue engineering. Engineering topics will also include discussions concerning the design of equipment and materials for, dialysis, oxygenation, artificial organs, and tissue engineering. Prerequisites: MTH 245, PCE 414, and a grade of C or better in PCE 204, or by permission of the instructor.

**PCE 441/541 POLLUTION PREVENTION IN**

**ENVIRONMENTAL MANAGEMENT (3)** Provides understanding of how corporations respond to governmental regulation by setting up environmental management systems which employ the principles of pollution prevention. Engineering concepts such as material balances, energy balances, risk assessment, and life cycle assessment have impacted new process designs. In this course a basis for evolution and maturation of pollution prevention as a fundamental methodology to ensure compliance and economic sustainability of industrial processes will be provided. The understanding of the concepts of pollution will be demonstrated by participation in a class project sponsored by industry at one of their facilities. Prerequisite: A grade of C or better in PCE 204 and Junior Standing. Co-requisite: PCE/MME 341.

**PCE 442/542 AIR POLLUTION CONTROL (3)** This course will introduce students to the formation and control of air pollutants, engineering theories and principles pertaining to the design of air pollution control operations, and environmental legislation. Solutions to environmental problems will be investigated, considering technical, economical and ethical aspects of engineering. Prerequisites: PCE/MME 313, 314, 341, and a grade of C or better in PCE 204.

**PCE 450/550 SPECIAL TOPICS (1-5; maximum 20)**

**PCE 451/551 UNIT OPERATIONS LABORATORY II (2)** Laboratory course consisting of experiments and computer simulations in topic from the process industries involving heat, mass and momentum transfer, and process control. Both written and oral laboratory reports are required. Prerequisites: PCE/MME 4 03, PCE 414. Co-requisite: PCE 482.

**PCE 471, 472 ENGINEERING DESIGN I AND II (1, 2)** Involves application and synthesis of accumulated knowledge in a major, open-ended, industrial research/design project. Critical elements of the design process and real world constraints (economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability) are considered. Emphasis is placed on oral and written communication skills. Students from different academic backgrounds are assigned to multidisciplinary project teams in order to utilize their varied experiences, knowledge, learning styles, and skills to achieve a successful conclusion to each project. Prerequisite: senior standing, or permission of instructor.

**PCE 473/573 CHEMICAL PROCESS DESIGN (3)** this is a project-based course in which chemical engineering technology, process simulation, and economic analysis are used to design chemical processes. The technical and economic aspects of equipment selection and design and alternative methods of operation will be covered. Prerequisites: PCE/MME 341, PCE/MME 403, and a grade of C or better in PCE 204. Co-requisites: PCE 414 and 415.

**PCE 482/582 PROCESS CONTROL (3)** Study of system dynamics and control schemes used for continuous processes. Block diagrams, steady-state and dynamic response, Laplace transforms, computer simulations and closed loop control. Stability, tuning, and controller synthesis. Prerequisites: PCE/MME 313, 314 and MTH 245.

**PCE 490/590A PAPER COATING (1).** The course provides an introduction to the coating and surface treatments applied to paper and paperboards to improve functional performance. The materials, processes and equipment used in surface sizing, aqueous pigmented coating and polymer coating/lamination will be covered. Prerequisites: PCE 202 or graduate standing.

**PCE 490/590B PRINTING AND CONVERTING PROCESSES (1).** The course provides an introduction to conventional and digital printing processes used on paper, films and foils. Converting operations including winding, supercalendering, corrugating and box assembly. Prerequisites: PCE 202 or graduate standing.

**PCE 490/590C PAPER MANUFACTURING (1)** Provides students with the opportunity to synthesize their accumulated knowledge and skills in paper science, paper engineering, economics, statistical methods, environmental technology, writing, and teamwork fundamentals. Student teams determined the raw materials and processing conditions required to produce paper that matches a sample of "unknown paper". They develop strategies for monitoring and improving team effectiveness continuously. They carry out the engineering, environmental impact, and economic analyses required for a global product development project. And, they learn how to apply high ethical standards to such projects. Prerequisites: PCE 202, PCE 404, or permission of instructor.

**PCE 490/590 D FUNDAMENTALS OF CORROSION (1)** Principles, mechanisms, and characteristics of corrosion. Corrosion behavior of metals, alloys, plastics and ceramics. Methods of corrosion prevention. Prerequisites: CHM 351 or CHM 361 or graduate standing

**PCE 491 INTRODUCTION TO RESEARCH (1-3)** Research problems in chemical engineering and paper science selected in consultation with a faculty advisor. Research methodology; design of laboratory experiments and computer simulations; critical analysis of results; technical reports; oral presentations. For grade only. Prerequisites: Permission of instructor, subject to approval of the department chair.

## PCE Department Faculty and Staff 2009-2010

Name	Phone Number	Office Number	Email
<b><u>PROFESSORS</u></b>			
<b>Dr. Shashi Lalvani</b> Professor and Chair	529-0763	Engineering Building 64 D	lalvansb@muohio.edu
<b>Dr. Catherine Almquist</b> Associate Professor	529-0767	Engineering Building 64 J	almquic@muohio.edu
<b>Dr. Douglas Coffin</b> Professor	529-0771	Engineering Building 64 N	coffindw@muohio.edu
<b>Dr. Steven Keller</b> Associate Professor	529-0765	Engineering Building 64 G	kellerds@muohio.edu
<b>Dr. Lei Kerr</b> Assistant Professor	529-0768	Engineering Building 64 K	kerrll@muohio.edu
<b>Dr. Marvin Thrash</b> Assistant Professor	529-0772	Engineering Building 64 P	thrashme@muohio.edu
<b>Prof. Michael Waller</b> Professor	529-0769	Engineering Building 64 L	wallermh@muohio.edu
<b>Dr. Azizeh “Amy” Yousefi Moshirabad</b> Associate Professor	529-0760	Engineering Building 64 M	moshiray@muohio.edu
<b><u>STAFF</u></b>			
<b>Ms. Laurie Picadio</b> Master Administrative Assistant	529-0762	Engineering Building 64	guestl@muohio.edu
<b>Mr. Douglas Hart</b> Senior Laboratory Technician	529-0778	Engineering Building 63	hartdw@muohio.edu
<b><u>GRADUATE STUDENTS</u></b>			
<b>Kaushik Chandler</b>	529-0774	Engineering Building 66	
<b>Xue “Emma” Chen</b>	529-0774	Engineering Building 66	chenx4@muohio.edu
<b>Yan Huang</b>	529-0774	Engineering Building 66	huangy2@muohio.edu
<b>Kun Li</b>	529-0774	Engineering Building 66	
<b>Austin McCormick</b>	529-0774	Engineering Building 66	mccormaj@muohio.edu
<b>Bo Wang</b>	529-0774	Engineering Building 66	wangb3@muohio.edu
<b>Jie Wu</b>	529-0774	Engineering Building 66	

**STUDENT PETITION**

**MIAMI UNIVERSITY  
OXFORD, OH 45056**

Catalog Year \_\_\_\_\_

NAME \_\_\_\_\_ DATE \_\_\_\_\_

BANNER \_\_\_\_\_ DIVISION \_\_\_\_\_ MAJOR \_\_\_\_\_

MU HR ATTEMPTED \_\_\_\_\_ HOURS EARNED \_\_\_\_\_ CUM GPA \_\_\_\_\_ EXP GRAD DATE \_\_\_\_\_

CAMPUS:  OXFORD  HAMILTON  MIDDLETOWN

\*  CAMPUS ADDRESS \_\_\_\_\_ PHONE \_\_\_\_\_

HOME STREET ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_ ZIP \_\_\_\_\_ PHONE \_\_\_\_\_

I hereby petition to: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

My reasons are (use reverse side if needed): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

Student's Signature \_\_\_\_\_

Adviser's signature and comments (required):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Other signatures and comments as recommended by adviser:

Signature	Comments
<input type="checkbox"/> Depart Chair _____	_____
<input type="checkbox"/> Instructor _____	_____
<input type="checkbox"/> Other _____	_____

*Note: If the recommendation of the Health Service or the Student Counseling Service is requested, the student should first obtain all other signatures needed and then leave the petition with Health or Counseling Service for forwarding to the Divisional Dean's Office. If both signatures are needed, Counseling will forward this form to the Health Service.*

Health Service \_\_\_\_\_

Counseling Service \_\_\_\_\_

**PLEASE DO NOT WRITE BELOW THIS LINE**

**ACTION TAKEN:**

Divisional Committee of Advisers:  Approved  Denied Date \_\_\_\_\_

Interdivisional Committee of Advisers:  Approved  Denied Date \_\_\_\_\_

Adviser Notified \_\_\_\_\_ by \_\_\_\_\_  
Date Signature

\*Please indicate address you wish to use for notification of action.



## PCE Departmental Advising List for 2009-2010

Dappen	Andrea M	Engineering Management	Environmental	Dr. Almquist
Daniels	Felicia	Chemical Engineering	BioChemical - Chem E	Dr. Coffin
		Paper Science & Engineering		
Deighan	Clayton J	Chemical Engineering	Undecided - Chem E	Dr. Keller
Denmark	Aeriel I	Chemical Engineering		Dr. Kerr
Diehl	Michael W	Chemical Engineering		Dr. Keller
Dinkgrave	Andrew A	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Dolan	Daniel P	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Dong	Miao L	Bio Engineering		Dr. Lalvani
Donnelly	Kevin	Chemical Engineering	Undecided - Chem E	Dr. Keller
Dooley	Jenet M	Engineering Management	Environmental	Dr. Almquist
Dorenkott	Ryan M	Paper Science & Engineering		Dr. Keller
Doty	Amber E	Chemical Engineering		Dr. Kerr
Druga	Zachary A.	Chemical Engineering	Undecided - Chem E	Dr. Lalvani
Duffy	Kyle G.	Engineering Management	Environmental	Dr. Almquist
			Operations management minor	
Duvall	Dustin P.	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Eckel	Anson J	Chemical Engineering	Paper - Chem E	Dr. Almquist
Eilers	Michael R	Engineering Management	Environmental	Dr. Almquist
Emola	Lauren E	Engineering Management	Environmental	Dr. Almquist
Epstein	Jillian M	Chemical Engineering		Dr. Thrash
Evans	Zachary E	Chemical Engineering	BioChemical - Chem E	Dr. Keller
Fabisch	Paul H	Chemical Engineering	Undecided - Chem E	Dr. Kerr
Falana	Bryan	Chemical Engineering	Paper - Chem E	Dr. Lalvani
Fehr	Matthew M	Chemical Engineering	BioChemical - Chem E	Dr. Keller
Ferriell	Dara M	Chemical Engineering		Dr. Coffin
Flannery	Ryan M	Chemical Engineering		Dr. Keller
Frazier	Karen R	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Fudge	Allison E	Chemical Engineering	BioChemical - Chem E	Dr. Keller
Gainey	Milton B	Engineering Management	Environmental	Dr. Almquist
Gasbarro	Nina M	Chemical Engineering		Dr. Almquist
Geerken	Alycia M	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Gonzalez	Cristina E	Chemical Engineering	Paper - Chem E	Dr. Thrash
			BioChemical - Chem E	

## PCE Departmental Advising List for 2009-2010

Goyal	Kashika G	Chemical Engineering		Dr. Kerr
Grimm	Dennis J	Paper Science & Engineering		Dr. Coffin
Grossman	Paul R	Chemical Engineering		Dr. Thrash
Gruber	Jesse	Chemical Engineering		Dr. Keller
Handley	Grace R	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Hankins	Joshua J	Chemical Engineering	Paper - Chem E	Dr. Keller
Harkins	Kelsey	Chemical Engineering	Environmental - Chem E	Dr. Lalvani
Harnish	Brennan	Engineering Management	Environmental	Dr. Almquist
Hartman	Stephen M	Chemical Engineering		Dr. Coffin
Hayes	Aleece M	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Heflin	Benjamin H	Chemical Engineering		Dr. Coffin
Hemmelgarn	Christopher T	Chemical Engineering		Dr. Keller
Henderlite	Ewen C	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Henninger	Andrew N	Chemical Engineering		Dr. Lalvani
Hildebrand	Gregory R	Chemical Engineering		Dr. Almquist
Hogg	Jess T	Chemical Engineering	Paper - Chem E	Dr. Lalvani
			BioChemical - Chem E	
Hogg	Joshua S	Paper Science & Engineering		Dr. Coffin
Holland	Zachary L	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Howell	Rachel L	Chemical Engineering	BioChemical - Chem E	Dr. Coffin
Hummel	Jordan T	Chemical Engineering		Dr. Coffin
Hyland	Jacob S	Paper Science & Engineering		Dr. Almquist
Iloka	Obie D	Engineering Management	Environmental	Dr. Almquist
Jacques	Nicole E	Chemical Engineering		Dr. Coffin
Janssen	Matthew S	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Jenkins	Brett N	Chemical Engineering	Paper - Chem E	Dr. Kerr
		Paper Science & Engineering		
Jiang	Yuntong	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
			Environmental - Chem E	
Johnson	Jasmine	Chemical Engineering		Dr. Thrash
Jones	Nathan R	Engineering Management	Paper	Dr. Coffin
Kallman	Matthew	Engineering Management	Envrionmental	Dr. Almquist
Karnes	Michael	Paper Science & Engineering		Dr. Keller
		Manufacturing Engineering		

## PCE Departmental Advising List for 2009-2010

Kavetza	Sheryl	Chemical Engineering	Paper - Chem E	Dr. Kerr
		Paper Science & Engineering		
Kelly	Nicholas J	Chemical Engineering		Dr. Keller
Klingbeil	Stacey F.	Engineering Management	Environmental	Dr. Almquist
Kreamer	Jeremy R	Basic Engineering		Dr. Kerr
Kurachek	Samuel T	Chemical Engineering	Environmental - Chem E	Dr. Lalvani
		Paper Science & Engineering		
LaFrance	Roger R	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Lambropoulos	Anna M	Engineering Management	Environmental	Dr. Almquist
Landis	Christopher H	Chemical Engineering	Undecided - Chem E	Dr. Almquist
		Engineering Management	Environmental	Dr. Almquist
Laney	Alexander J	Chemical Engineering		Dr. Thrash
Lee	Adam	Paper Science & Engineering		Dr. Coffin
		Chemical Engineering	Undecided - Chem E	
Lemmo	Stephanie A	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Leszczak	Victoria	Chemical Engineering	BioChemical - Chem E	Dr. Lalvani
Leventry	Erin	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Linch	Meredith A	Engineering Management	Environmental	Dr. Almquist
Long	Ryan E	Paper Science & Engineering		Dr. Keller
		Chemical Engineering		
Lucas	Robert B	Chemical Engineering		Dr. Coffin
Mahoney	Kaitlyn M	Engineering Management	Environmental	Dr. Almquist
Makaroff	Erik T	Chemical Engineering		Dr. Lalvani
Mattingly	Justin W	Chemical Engineering	Paper - Chem E	Dr. Lalvani
Maurer	April M	Chemical Engineering	Environmental - Chem E	Dr. Almquist
McArthur	Amanda R	Engineering Management	Environmental	Dr. Almquist
McCormick	Austin J	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
		Combined BS/MS		
		Paper Science & Engineering		
McCoy	Zachary D	Chemical Engineering	Environmental - Chem E	Dr. Thrash
		Engineering Management	Environmental	
McFadden	Jarret N	Chemical Engineering	Environmental - Chem E	Dr. Almquist

## PCE Departmental Advising List for 2009-2010

Mead	David J	Chemical Engineering	BioChemical - Chem E	Dr. Almquist
Merrill	Joseph T	Engineering Management	Environmental	
Miller	Amy M	Engineering Management	Environmental	Dr. Almquist
Minton	Joshua A	Chemical Engineering	BioChemical - Chem E	Dr. Coffin
Mitchell	Steven C	Chemical Engineering		Dr. Keller
Mohler	David J	Chemical Engineering	BioChemical - Chem E	Dr. Keller
Moran	Aaron A	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Morrow	Nicholas A	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Moyer	Davyd M	Chemical Engineering		Dr. Lalvani
Nelson	William F	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
			Environmental - Chem E	
Newman	Mackenzie S	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Nolan	Cassidy M	Chemical Engineering	Paper - Chem E	Dr. Coffin
Pallete	Alessandra	Chemical Engineering	Environmental	Dr. Kerr
			Paper - Chem E	
		Paper Science & Engineering		
Paugh	Dana M	Engineering Management	Environmental	Dr. Almquist
Pfirsch	Ryan W	Chemical Engineering	Paper - Chem E	Dr. Coffin
Pinchbeck	Alex W	Chemical Engineering		Dr. Kerr
Ponton	Richard J	Chemical Engineering	Paper - Chem E	Dr. Coffin
		Natural Science		
Queen	Leah B	Chemical Engineering	Undecided - Chem E	Dr. Almquist
Ratajczak	Stephen	Chemical Engineering	Paper - Chem E	Dr. Coffin
			BioChemical - Chem E	
Reed	Atiyaa	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
			Paper - Chem E	
Reser	Kristen M	Chemical Engineering		Dr. Lalvani
Reynolds	Andrew L	Chemical Engineering	Environmental - Chem E	Dr. Almquist
Richardson	Benjamin P	Chemical Engineering	Undecided - Chem E	Dr. Keller
Robie	Taylor A.	Chemical Engineering		Dr. Thrash
Ryan	Elise M	Chemical Engineering	Paper - Chem E	Dr. Thrash
			BioChemical - Chem E	
		Paper Science & Engineering		
Sayegh	Gillian T	Chemical Engineering	Environmental - Chem E	Dr. Keller
			BioChemical - Chem E	
Scholtz	Scott K	Engineering Management	Environmental	Dr. Almquist
Schuerger	Ryan W	Chemical Engineering	Paper - Chem E	Dr. Thrash

## PCE Departmental Advising List for 2009-2010

Sheets	Johnathan P	Engineering Management	Environmental	Dr. Almquist
Singer	Sophia A	Paper Science & Engineering		Dr. Coffin
Singleton	Kevin M	Paper Science & Engineering		Dr. Keller
Slejko	Glen C	Chemical Engineering	Undecided - Chem E	Dr. Lalvani
Smith	Aaron D	Chemical Engineering	Undecided - Chem E	Dr. Thrash
Smolyansky	Ilya D	Engineering Management	Environmental	Dr. Almquist
Snavely	Gina C	Chemical Engineering		Dr. Thrash
Stephens	Adam E	Chemical Engineering		Dr. Keller
Stiwald	Adam C.	Chemical Engineering	Environmental - Chem E	Dr. Keller
			Paper - Chem E	
		Paper Science & Engineering		
Szucs	Thomas J	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Tan	Qiao W	Chemical Engineering	BioChemical - Chem E	Dr. Kerr
Tannous	Jennifer R	Chemical Engineering	Undecided - Chem E	Dr. Keller
Taylor	Steven M	Paper Science & Engineering		Dr. Keller
		Computer Science		
Terrell	Brice L	Chemical Engineering	Paper - Chem E	Dr. Almquist
Tilly	Trevor	Engineering Management	Environmental	Dr. Almquist
Troll	Louis R	Chemical Engineering	Paper - Chem E	Dr. Keller
Updyke	Marcus	Chemical Engineering		Dr. Kerr
Vasko	Scott S	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
Voigt	Kathryn A	Chemical Engineering	Paper - Chem E	Dr. Lalvani
			BioChemical - Chem E	
Vyas	Parag P	Chemical Engineering		Dr. Almquist
Wallace	William D	Paper Science & Engineering		Dr. Keller
		Chemical Engineering	Paper - Chem E	
Watkins	John H	Engineering Management	Paper	Dr. Coffin
Werner	David A	Chemical Engineering	Undecided - Chem E	Dr. Thrash
Wickenheiser	Marilyn R	Chemical Engineering	BioChemical - Chem E	Dr. Lalvani
Wilczynski	Daniel J	Chemical Engineering		Dr. Coffin
Wildeman	Samuel R	Chemical Engineering		Dr. Thrash
Windham	Charles T	Chemical Engineering	BioChemical - Chem E	Dr. Thrash
			Paper - Chem E	
Wise	Keith R	Engineering Management	Environmental	Dr. Almquist

## PCE Departmental Advising List for 2009-2010

Woehrmeyer	John P	Chemical Engineering		Dr. Lalvani
Wood	Nathan V	Chemical Engineering	Paper - Chem E	Dr. Kerr
Wooliver	Shannon B	Chemical Engineering		Dr. Keller
Wren	Matthew A	Chemical Engineering	BioChemical - Chem E	Dr. Almquist
Zelle	Bryan A	Paper Science & Engineering		Dr. Keller
		Engineering Management	Paper	
Zhou	Xiaojuan	Chemical Engineering	Paper - Chem E	Dr. Coffin