Integrated Product and Process Design (IPPD) Syllabus Fall 2011 and Spring 2012

ABE 4912, EAS 4912, EML 4913, ECH 4912, EIN 4912, EEL 4912, CIS 4912C, EMA 4915, MAN 4538 Fall semester
ABE 4913, EAS 4913, EML 4913, ECH 4913, EIN 4913, EEL 4913, CIS 4913C, EMA 4916, MAN 4539 Spring semester

1. Catalog Description (including credit hours) 3 hours for Fall and 3 hours for Spring

   A two-semester-course sequence in which multi disciplinary teams of engineering and business students partner with industry sponsors to design and build authentic products and processes—on time and within budget. Working closely with industry liaison engineers and a faculty coach, students gain practical experience in teamwork and communication, problem solving and engineering design, and develop leadership, management and people skills.

2. Pre-requisites and Co-requisites

Agricultural and Biological Engineering (any two of the following three courses)
- ABE 3612C Heat and Mass Transfer in Biological Systems
- ABE 3652C Physical and Rheological Properties of Biological Materials
- ABE 4231C Irrigation and Drainage Engineering

Business Administration (MAN 4504 and one of the remaining three courses)
- MAN 4504 Operations Management
- FIN 3408 Business Finance
- MAR 3023 Principles of Marketing
- ECO 3100 Managerial Economics

Chemical Engineering
- ECH 3203 Chemical Operations 1
- ECH 4604 Process Economics

Computer & Information Science & Engineering (CEN, CSC, CLS degrees)
- CEN 3031 Introduction Software Engineering
- CIS 3020 Introduction to Computer &Information Science
- COT 3100 Application of Discrete Structures
- CDA 3101 Introduction to Computer Organization
- COP 3530 Data Structures & Algorithms
- COP 4600 Operating Systems

Electrical & Computer Engineering (EE & CEE degrees)
- EEL 3135 Discrete-Time Signals and Systems
- EEL 3304C Electronic Circuits 1
- EEL 3701C Digital Logic and Computer Systems
- COP 3530 Data Structures & Algorithms (CEE degree only)

EE Degree Corequisites:
- EEL XXXX (3000 level or higher EEL course)
- EEL 4XXX (4000 level EEL course)

CEE Degree Corequisites (pick 2):
- EEL 4712C Digital Design
- EEL 4744C Microprocessor Applications
- COP 4600 Operating Systems

Environmental Engineering (two of the following four courses)
- ENV 4351 Solid & Hazardous Waste Management
- ENV 4121 Air Pollution and Control Design
- ENV 4514C Water and Wastewater 2
- ENV 4561 Hydraulic Systems Design

Industrial & Systems Engineering
- EIN 4365 Facilities Design and Material Handling
- ESI 4221C Industrial Quality Control (Corequisite)
- EIN 4354 Engineering Economy

Materials Science & Engineering
- EMA 3010 Materials
- EMA 4717 Materials Selection and Failure Analysis

Mechanical and Aerospace Engineering
- EGM 3520 Mechanics of Materials
- EML 3301C Instrumentation & Measurements Lab

Aerospace Engineering Degree
- EAS 4101 Aerodynamics

Mechanical Engineering Degree
- EML 3005C Mechanical Engineering Design

To be eligible to apply for the IPPD Program, the applicant must:
1) have completed the prerequisites for his/her major
2) be a senior who is graduating in a spring or summer term
3) not have more than 30 semester hours left to be complete for graduation[1]
4) attach his/her résumé to the application

3. Course Objectives

- Learn effective product and process design elements
  - Function & Producibility
  - Cost (within budget)
  - Schedule
  - Reliability
  - Customer Preference
  - Life Cycle

- Function successfully in multidisciplinary teams
  - 4-8 student members, faculty coach, and sponsor liaison
  - Classroom & laboratory experience in two-semesters (6 credit course)

- Exercise leadership, management and people skills
  - multi criterion decision making techniques
  - effective business meetings with remote clients
  - professional presentation and writing skills

[1] minor variances can be negotiated

Working in small multidisciplinary project teams, students get important practical experience in teamwork and communication and in developing their leadership, management and people skills.

Advantages of integrating product and process design are well recognized by industry. Concurrent design of products and processes improves product costs and quality and reduces time-to-market. Students who have worked on real-life projects and know how to work in teams are more valuable as employees. They also recognize the importance of communication among different engineering and business disciplines.

Industry participation in this program offers distinct benefits. Industry sponsors not only influence the education of potential employees but will also have students design an important project at very competitive costs. IPPD can provide the sponsoring company with valuable interaction with faculty who have interest and expertise in technical areas of the business. Sponsors will gain visibility with UF students and be able to identify and recruit the best.

4. Contribution of the course to meeting the professional component

This course sequence prepares students for engineering practice through a major design experience based on the knowledge and skills acquired in earlier course work and incorporating appropriate engineering standards and multiple realistic constraints. The courses will help students function on multidisciplinary teams; identify, formulate and solve engineering problems; understand professional and ethical responsibilities; communicate effectively; understand the impact of engineering solutions in a global and societal context; and understand contemporary engineering issues.

5. Relationship of course to program outcomes (skills students will develop in this course)

This course will help prepare students for professional careers. After completing the course sequence, students should understand their professional and ethical responsibilities, be aware of contemporary engineering issues, and recognize the need for life-long learning.

6. Instructor – Dr. R. Keith Stanfill

a. Office location- 378 Weil Hall, Director (Faculty Coaches offices will vary by the project team)
b. Telephone- (352) 846-3354
c. E-mail address: stanfill@ufl.edu
d. Website: http://www.ippd.ufl.edu
e. Office hours: Period and days will be established after the first week of class, appointments welcomed

7. Teaching Assistants – IPPD Staff

-Norman Miller

a. Office location-176 NEB
b. Telephone-352-392-4629

c. E-mail address-nmiller@ippd.ufl.edu
d. Office hours-TBA

-Maureen Milch
a. Office location- 176 NEB
b. Telephone- 352-846-1975
c. E-mail address- program@ippd.ufl.edu
d. Office hours- TBA

8. Meeting Times: T, 8-10 (3-6pm), 170 Pugh Hall

9. Class laboratory schedule, i.e., number of sessions each week and duration of each session
Weekly team meeting schedule is to be arranged between the team members, coach and sponsor liaison, 1 or 2 sessions per week, Main IPPD lab facility NEB 154; satellite lab facility in Reed Labs will be available in October (details TBA). **Teams may not meet during Class Meeting times (please refer to #8 on syllabus)**

10. Meeting Location-170 Pugh Hall

11. Material and Supply Fees – none

12. Textbooks and Software Required

A. Main course text
i. Title – Product Design and Development
ii. Author – Karl T. Ulrich and Steven D. Eppinger
iii. Publication date and edition – either edition: 2004 ed. 3 or 2008 ed. 4
iv. ISBN number – 9780072471465 (3rd ed.) or 9780073101422 (4th ed.)

B. Online manual defining course deliverables, policies and procedures
i. Title – New Engineer's Training Manual
ii. Author – H.K. Fridrich and R.K. Stanfill
iii. Publication date and edition – University of Florida 1997-2002
iv. ISBN number - N/A given access to online book on secure website on MyIPPD https://my.ippd.ufl.edu/ and IPPD Wiki https://my.ippd.ufl.edu/trac/public/wiki/IPPDGuide

C. IPPD uses the TurningPoint RCRF-01 (or RCRF-02 or RCRF-03) clicker. For more information, including how to order online with a discount code "4ufl" for UF students, visit http://classrooms.at.ufl.edu/crs.php
Note: clickers will be needed for week 3 of the IPPD course. Local bookstores run out quickly, so consider purchasing directly from TurningPoint.

13. Recommended Reading
a. Title - Product Design
b. Author - by Kevin Otto (Author), Kristin Wood (Author)
c. Publication date and edition - Prentice Hall (December 8, 2000)
d. ISBN number - ISBN-10: 0130212717

ISBN-13: 978-0130212719

Goal QPC Team Memory Jogger
Sommerville Software Engineering ed. 8 or ed. 9

14. Course Outline

Major Deliverables:

- Preliminary Design Report – October 2011
- System Level Design Report – December 2011
- Final Report and Project Documentation – April 2012
- Prototype system (hardware, process, software or simulation) – April 2012
- Project poster and video – April 2012

Hardware & Software Milestones:

- Requirements
- Specifications
- Product Architecture
- Project Plan
- Prototype Plan / Results
- Analytical and Experimental Plan / Results
- Detailed Design
- Acceptance Test / Product Verification
- Business Case
- Manufacturing Plan and Product Cost

Evaluations, Surveys & Forms, In-Class Activities

- Team, individual, class, coach and liaison evaluations
- Weekly Meeting Minutes & project status memos
- Sakai-based lessons
- Pre assessment & Post assessment of Educational Outcomes
- Travel request forms and Materials & Supplies request web-based forms
- In-Class Activities [Project Team (PT) and In-Class Team (ICT)]
- Online forms on MyIPPD and Sakai
- Design Review & Final checklist

Important Dates

Sponsor Meet & Greet

- Travel to sponsor: complete by 12 September

Preliminary Design Review

- Peer review: 11 October (in class)
- Travel to sponsor: 12 to 24 October (to be arranged with sponsor)

System Level Design Review

- Peer review: 6 December (in class)
- Presentation pre-load: 7 December (TBA)
- On-campus (JWRU) review: 8:00 AM to 2:00 PM, 8 December 2011

Final Design Review

- Peer review: 3 and 10 April (in class)
- On-campus (JWRU) review: 16 or 17 April (time and date subject to change)

Weekly Schedule (Google Calendar) & Syllabus

- Syllabus on Sakai
- Online at http://www.ippd.ufl.edu click on MyIPPD https://my.ippd.ufl.edu/
- My IPPD Google Calendar of weekly schedule
- Detailed weekly lecture schedule: on Sakai

15. Attendance and Expectations

Attendance in class and team-related activities is an element of professionalism. Unless otherwise specified, attendance is expected for all lectures and design reviews and attendance will be taken in every class meeting. Since class meets for 3 periods, leaving prior to the conclusion of class *may* be considered an absence (ask before class if you can leave early).

Students may miss 1 class meeting without penalty. Each absence beyond 1 will reduce the overall grade by 1 percentage point. Absences will be excused under the following conditions:

- you alert Dr. Stanfill and your coach 24 hours ahead of time that you have a legitimate, unavoidable absence (such as an exam conflict for a higher numbered academic course)
- you have a verifiable medical or family emergency
- you have travel for a student conference—provided all excuse request forms are completely filled out and approved by your coach and Dr. Stanfill 30 days prior to travel
- your team has project travel that has been pre-approved by Dr. Stanfill

Fall Semester only: up to two "technology" absences will be allowed for occasions when you forget your clicker.

Attendance will be posted on e-Learning on the IPPD Sakai site; see https://lss.at.ufl.edu/

16. Grading - methods of evaluation
See the New Engineer's Training Manual https://my.ippd.ufl.edu/trac/public/wiki/IPPDGuide.

Evaluator: Faculty coach

- The project coach assigns the team, and individual grades with input from the liaison engineer, Qualification Review Board (QRB), Director, and 3 team-member evaluations administered during each semester

Evaluator: Qualification Review Board (QRB)

- A QRB will monitor the progress of each team
  - QRB composition:
    - Team's faculty coach
    - Two or more IPPD faculty
  - QRB role:
    - Provide feedback to team on project content and quality
    - Assist coach in evaluating reports and presentations
    - Identify project issues and corrective actions
    - Provide feedback to IPPD Director

Evaluator: IPPD Director

- The IPPD Director tracks attendance, course deliverables, completion of evaluations, surveys and forms, lessons defined in Sakai[2], and completion of end-of-term final checklists
  - each lecture absence beyond 1 will result in a 1% reduction in the final grade
  - each missed evaluation or survey will result in a 1% reduction in the final grade
- The Director also accesses all major deliverable reports for quality of the content and presentation. Note: reports that do not meet professional standards will not be accepted.

Grade Element	Coach's Contribution	IPPD Director's Contribution	Total
Individual performance	35%	10%	45%
Project quality	40%	10%	50%
Attendance		5%	5%
Total individual grade	75%	25%	100%

Notes:

a. The average of the individual grades on a given team may not be higher than the team project quality grade. For example, if the team project quality grade is a B+, then the average of the individual grades on that team may no be higher than a B+.

b. The project coach assigns the project quality and individual performance grades with input from the sponsor liaison engineer, the Qualification Review Board for the team, the IPPD Director, and three team-member (peer) evaluations administered during each semester.

c. Regardless of the team's overall performance, the faculty coach has the authority to raise or lower an individual's grade

[2] In lieu of a live lecture, some materials may be packaged in Sakai-based lessons. Typically there will be a brief reading assignment and a few questions to answer prior to receiving credit for lesson completion.

d. A midterm grade will be provided for each team and individual in early November for the Fall semester and in early March for the Spring semester. At the coach's discretion, this grade report may accompany individual team member performance review meetings.

17. Grading Scale

See the New Engineer's Training Manual https://my.ippd.ufl.edu/trac/public/wiki/IPPDGuide.

Grade	Performance Characteristic
A	outstanding grade—must demonstrate initiative, be self-motivated, and go beyond what is asked for in the program
B	above-average grade—requires that all assignments are completed on time, done with care, and done correctly
C	average grade—awarded for work that is on time, but demonstrates a lack of initiative
D	below-average grade—awarded for work that is late, only partly fulfills the requirements, and demonstrates no initiative
E	failing grade—given for work that is missed and does not fulfill the requirements of the assignment

A ≥ 90; A- ≥86.7; B+ ≥ 83.3; B ≥ 80, B- ≥ 76.7; C+ ≥ 73.3; C ≥ 70, C- ≥ 66.7; D+ ≥ 63.3; D ≥ 60, D- ≥ 56.7; E < 56.7

Notes:

a. Grades will be posted on e-Learning on the IPPD Sakai site; see https://lss.at.ufl.edu/.

b. Grades will not be curved; however, grades across teams will be compared and monitored for consistency.

c. "-" and "+" grades will be assigned

d. If the project is not complete at the end of the term, responsible team members, up to and including the entire team, are subject to incomplete grades; examples of incomplete projects include unfinished or unprofessional final documentation, partially completed, untested or non-functional final prototypes, project data files that have not been organized for proper archiving, and incomplete final project checklists. Incomplete grades will be corrected as soon as the work is finalized.

e. A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

18. Termination Policy

IPPD has a detailed procedure for terminating students whose participation or lack of participation on the project team jeopardizes the ability of the project team to successfully meet the academic goals of the IPPD program and/or the sponsored project goals.

Detrimental team member behaviors include, but are not limited to, lack of participation in team activities, refusal to complete required deliverables on time, insubordination towards the project coach, project sponsor, liaison engineer, IPPD Director or an IPPD staff member, unprofessional conduct during project travel, extremely poor team member evaluations, and poor attendance.

Students who exhibit these behaviors or embody these characteristics will meet with their project coach and be provided with a written description of the unacceptable actions/behaviors and an action plan for correcting the unacceptable behavior. Progress on the action plan will be monitored and if satisfactory progress is made, then the student may continue with IPPD. Otherwise, the coach will collect peer feedback and consult with the IPPD Director to determine a course of action. The offending student will meet with the coach and IPPD Director to determine if the student can continue with IPPD. **Fall semester:** If the student is terminated, then the student will receive an appropriate grade, up to and including a failing grade, and will not be allowed to register for the following IPPD semester, nor have access to any of the IPPD facilities or project team resources. **Spring semester:** If a student is terminated, then the student will receive a failing grade and will have access to IPPD facilities and project team resources revoked.

The complete termination policy will be available in the IPPD New Engineer's Training Manual available at https://my.ippd.ufl.edu/trac/public/wiki/IPPDGuide

19. Make-up Exam Policy - No exams

20. Honesty Policy - All students admitted to the University of Florida pave signed a statement· of academic honesty committing themselves to be honest-in all academic work and understanding that failure to comply with this commitment will result in disciplinary action. This statement is a reminder to uphold your obligation as a UF student and to be honest in all work submitted and exams taken in this course and all others.

> Signing an attendance sheet for an absent or tardy student, or responding with a clicker on behalf of an absent or tardy student is in violation of the academic honesty policy and will result in disciplinary action. A first violation will result in a letter grade reduction for all involved parties. A second violation will result in course failure for all involved parties.

21. Accommodation for Students with Disabilities - Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

22. UF Counseling Services - Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:

- University Counseling Center, 301 Peabody Hall, 392-1575, Personal and Career Counseling.
- SHCC mental Health, Student Health Care Center, 392-1171, Personal and Counseling.

- Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling.
- Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling.

23. Software Use - All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.