Revised: August 25, 2014

Integrated Product and Process Design (IPPD) Syllabus Fall 2014 and Spring 2015

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

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

   A two-semester-course sequence in which multidisciplinary 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)	Environmental Engineering (two of the following four courses)
ABE 3612C Heat and Mass Transfer in Biological Systems ABE 3652C Physical & Rheological Properties of Biological Materials ABE 4231C Irrigation and Drainage Engineering	ENV 4351 Solid & Hazardous Waste Management ENV 4121 Air Pollution and Control Design ENV 4514C Water and Wastewater 2 ENV 4561 Hydraulic Systems Design
Business Administration (MAN 4504 and one of the remaining three courses)	**Industrial & Systems Engineering**
MAN 4504 Operations Management FIN 3408 Business Finance MAR 3023 Principles of Marketing ECO 3100 Managerial Economics	EIN 4365 Facilities Design and Material Handling ESI 4221C Industrial Quality Control (Co-requisite) EIN 4354 Engineering Economy
Chemical Engineering	**Materials Science & Engineering**
ECH 3203 Chemical Operations 1 ECH 4604 Process Economics	EMA 3010 Materials EMA 4717 Materials Selection and Failure Analysis
Computer & Information Science & Engineering (CEN, CSC, CLS degrees)	**Mechanical and Aerospace Engineering**
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	EGM 3520 Mechanics of Materials EML 3301C Instrumentation & Measurements Lab
Electrical & Computer Engineering (EE & CEE degrees)	**Aerospace Engineering Degree Co-requisites:**
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)	EAS 4101 Aerodynamics
EE Degree Co-requisites:	**Mechanical Engineering Degree Co-requisites:**
EEL XXXX (3000 level or higher EEL course) EEL 4XXX (4000 level EEL course)	EML 3005C Mechanical Engineering Design
CEE Degree Co-requisites (pick 2):	**Biomedical Engineering**
EEL 4712C Digital Design EEL 4744C Microprocessor Applications COP 4600 Operating Systems	BME 4503 Biomedical Instrumentation BME 4503L Biomedical Instrumentation Laboratory

3. Course Objectives

- **Learn effective product and process design elements on a real-life project**
    - 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)
    - Students, coaches, sponsors, liaisons from different fields
    - Project practical experience
    - Teamwork
    - Professional practical experience
- **Exercise Professionalism (please, check out the Expectations section of this syllabus)**
    - Leadership, management and people skills
    - Multi-criterion decision-making techniques
    - Effective business meetings with remote clients
    - Professional presentation and writing skills
    - Professional communication
- **Satisfy the following ABET outcomes**
    - An ability to function on multidisciplinary teams
    - An ability to communicate effectively
- **Meet Discipline Capstone Design Objectives**
    - As this course is replacing your senior design course you must meet the minimum requirements of your discipline's senior design
    - A subproject(s) might be required to fulfill these objectives
    - Subproject(s) will be topically aligned, and integrated with, your IPPD project

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. Class Lecture Meeting Times:
   T, 8th-10th period (3-6pm)
   170 Pugh Hall and online E-learning class IPPD 1 Fall 2014 and IPPD 2 Spring 2015 on
   https://lss.at.ufl.edu/

7. Instructor:
    Dr. R. Keith Stanfill, IPPD Director
    Office location- 378 Weil Hall
    Telephone- (352) 846-3354
    E-mail address- stanfill@ufl.edu
    Office hours- Period and days will be established after the first week of class; appointments welcomed

8. Faculty Coaches:
    Offices and hours will vary by the project team

9. Teaching Assistants – IPPD Staff

    IPPD staff hours vary due to team purchase needs, meetings with sponsors and UF faculty/staff, off-campus purchases and other duties. Please check the IPPD Google Calendar located at https://my.ippd.ufl.edu/ for staff availability. The times IPPD staff will be available in the office will be from 9am to 4pm, except on class days office hours will be from 9am to 1pm. You are always welcome to make an appointment with an IPPD staff member if you need assistance (though an appointment is not required).

    Mariah Curry, IPPD Program Assistant, Office Location 176 Engineering Building, Telephone 352-846-1975, program@ippd.ufl.edu

    Joe Romine, IPPD System Administrator, 352-392-4629

    Jeff Beilling, IPPD Lab Manager, 352-846-1974

10. Class laboratory schedule, i.e., number of sessions each week and duration of each session
    Weekly team meeting schedule is to be arranged among 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 401, 405 & 408. **Teams may not meet during Class Meeting times (please refer to #6 on syllabus)**

11. 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 – 2004 ed. 3, 2008 ed. 4 or later
        iv. ISBN number – 9780072471465 (3rd ed.), 9780073101422 (4th ed.)
    B. **Online manual defining course deliverables, policies and procedures**
        i.   Title – *IPPD Training Manual*
        ii. Author – H.K. Fridrich and R.K. Stanfill
        iii. Publication date and edition – University of Florida 1997-2012 iv.
             Available on the IPPD e-Learning site
    C. **IPPD Professional Reference Manual**:
        You can find this in PDF form on e-Learning. All IPPD students must read and understand this manual. It serves as a reference for the policies of IPPD, effective team practices, and much more. Associated with the manual are a series of individual activities to be completed, including training courses (Preventing Sexual Harassment, At-risk Students and Laboratory Safety), completion of case studies, and uploading documents utilizing IPPD collaboration tools. **Access codes to enter the NEB and Reed Lab facilities will not be granted until the entire team completes the professionalism training requirements.**

12. Recommended Reading
   a. Title - *Project 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

13. Course Outline

Major Deliverables:
- Fall semester
  - Preliminary Design Report – October
  - **Discipline-specific Capstone Design Objectives-October**
  - Peer Review – October & December
  - Prototype Demonstration – December
  - System Level Design Report – December
- Spring semester
  - Qualifying Review Board Presentation-January & February
  - Peer Review-April
  - Final Report and Project Documentation – April
  - Prototype system (hardware, process, software or simulation) – April
  - Project poster and video – April

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
- Online forms on MyIPPD and e-Learning
- Team, individual, class, coach and liaison evaluations
- Weekly Meeting Minutes & project status memos
- e-Learning-based lessons
- Pre assessment & Post assessment of Educational Outcomes
- Travel requests and Materials & Supplies requests
- In-Class Activities
- Design Review & Final checklist

Sponsor Travel (may be done via travel or web meetings)

- 1st meeting- by end of September
- Preliminary Design Presentation- by end of October
- System Level Design Review- on campus, December
- Design Results presentations- by early April
- Final Design Review-on campus April

Weekly Schedule & Syllabus
- Syllabus and detailed weekly schedule on e-Learning
- Fall semester class structure: lectures, individual-team-group in-class activities, guest lectures
- Spring semester class structure: 1 lecture and/or guest lectures, 1 hour in discipline, 1 hour in team meeting
- Https://my.ippd.ufl.edu/ and e-Learning calendar will go over events and cancelled classes

14. Attendance

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. If you come to class late or leave early without permission you must email stanfill@ufl.edu and program@ippd.ufl.edu with the reason for why you arrived late or left early.

Students may miss 1 class meeting without penalty. Each absence beyond 1 will reduce the overall grade by 1 percentage point.
- 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

Absences will be excused under the following conditions if you have alerted stanfill@ufl.edu, program@ippd.ufl.edu, 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)
- A verifiable medical or family emergency
- 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
- Team has project team travel that has been pre-approved by Dr. Stanfill
- Need to come to class late or leave early for a legitimate reason

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. A second violation will result in course failure for all involved parties.

15. Expectations

Basic Responsibilities Expected of You:

a. Follow the syllabus and weekly schedule.
b. Check e-Learning for class updates, assignments, announcements, lessons, calendar, and resources.
c. Make sure you bring your clicker to every class to answer in-class questions.
d. Check https://my.ippd.ufl.edu/ calendar to see IPPD staff's availability.
e. Keep your information updated on https://my.ippd.ufl.edu/.
f. Use the SVN as instructed (uploads, and naming of folders and/or files).
g. Use the "Resources" folder and "Dropbox" in e-Learning as instructed (uploads, and naming of folders and/or files).
h. Read in-class activities and work on in-class activities in class.

Professional Responsibilities Expected of You:

a. Attendance of team meetings will be noted
b. Understanding the IPPD Professional Competency Model
c. Review, understand, and follow the Student Honor Code and Student Conduct
d. Code: http://www.dso.ufl.edu/sccr/currentstudents.php.
e. Report any unprofessionalism on the part of a team member, coach, liaison, IPPD staff, vendor staff, and people you come in contact with during IPPD travel.
f. Report cases of unprofessionalism to IPPD coaches, staff, or Director.
g. Speak professionally to IPPD staff, IPPD administration, IPPD student-staff, team members, coaches, and liaisons; all unprofessional comments that are reported to IPPD will be referred the IPPD Director, the Professional Committee, the Termination Committee, and/or the Dean of Students Office Conduct and Conflict Resolution.
h. All team travel costs are managed by IPPD; understand your budget for your prototype does not include travel costs.
i. Keep tabs on your team prototype budget as you go. An Excel sheet will be posted on e-Learning. Team is in charge of uploading it to the Team Wiki to alert coach and sponsor of purchasing.
j. Be patient:
    i. IPPD will try to complete your orders on the same day, but we have many orders to fulfill.
    ii. Even if your team, coach, or liaison wants something done immediately, there may be some roadblocks due to contractual agreements with vendors, sponsors, and/or UF.
    iii. Due to contractual agreements, some requests might have to be reviewed by UF Contracts and Grants Office. If this happens, all activity on the project must stop until a decision has been made (ITAR, EAR, and IRB).

Failure to meet any of the expectations listed above may result in disciplinary action from the IPPD Professionalism Committee, and/or termination, and/or a referral to the Dean of Students Conduct and Conflict Resolution.

IPPD Professionalism committee
The IPPD Professionalism committee is comprised of 2 IPPD faculty members, the team member's Coach, the IPPD Director, and a Counseling and Wellness Center member who will meet and formalize a plan for behavioral and professional improvement for the student. This meeting will be called if any of the Professionalism Competency model competencies are hindering you and/or your team. If the improvements are not met, then the Termination Policy will be put into effect.

Termination Policy
The Termination committee is comprised of the same people as the Professionalism Committee. 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 toward the current team leader, 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 on the IPPD e-Learning site.

16. Grading: Methods of evaluation

Evaluator: IPPD Director (Fall and Spring)
- The IPPD Director tracks attendance, course deliverables, completion of evaluations, surveys and forms, lessons defined in e-Learning and completion of design review needs, posters, videos, end-of-term final checklists. The Director also assesses all major deliverable reports for quality of the content and presentation. Note: reports that do not meet professional standards will not be accepted.

Evaluator: Faculty coach (Fall and Spring)
- The project coach assigns the team and individual grades with input from the liaison engineer, team performance peer reviews, during each semester, including the Qualification Review Board (QRB) in Fall and Spring semester.

Evaluator: Qualification Review Board (QRB) (Fall and Spring)
- A QRB will monitor the progress of each team
  - QRB composition:
    - Team's faculty coach
    - Two or more IPPD faculty

Midterm Evaluations and Final Grades
Midterm Evaluations
- Director will provide Individual and Team evaluations on attendance, completion of surveys, and team in-class participation.
- Coach will provide Individual and Team evaluations. Coach will share evaluations will students individually and provide evaluations to Director.
- Fall semester: directly after the Preliminary Design Report (late October)
- Spring semester: directly after Qualification Review Board 2 (late February)

Final Grades (posted at end of semester):

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

Notes on Grading:
a. See the IPPD New Engineer's Training Manual on the IPPD e-Learning site.
b. 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 not be higher than a B+.
c. Regardless of the team's overall performance, the faculty coach has the authority to raise or lower an individual's grade

d. Grading Scale

Grade	Performance Characteristic
A	outstanding grade—must demonstrate initiative, be self-motivated, and go beyond what is asked for in the program. Your performance in a real-world job would exceed standards and warrant raise in pay, or advancement, and/or awards. You exhibit strong developmental growth with mentorship and teamwork.
B	above-average grade—requires that all assignments are completed on time, done with care, and done correctly. Your performance in a real-world job would achieve performance standards of your job but not exceed. You are responding to mentorship and teamwork to meet requirements.
C	average grade—awarded for work that is on time, but demonstrates a lack of initiative. Your performance in a real-world job lacks timeliness, following guidelines to meet deadlines, and would require constant instructions, job performance evaluation, and possible job probation. You are having difficulty responding to mentorship and teamwork to meet requirements.
D	below-average grade—awarded for work that is late, only partly fulfills the requirements, and demonstrates no initiative. Your performance in a real-world job has unacceptable performance, does not meet deadlines, unprofessional practices, unwilling to work with others, and lacks effort for improvement and would result in demotion, job probation, suspension from projects, and possible termination of job. You do not involve yourself with the provided mentorship and teamwork to meet requirements.
E	failing grade—given for work that is missed and does not fulfill the requirements of the assignment. Your performance in a real-world job would achieve termination of job due to extreme unprofessionalism and performance insufficiencies. You are not interested in provided mentorship and teamwork.

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

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

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

g. 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.

h. Students participating on project teams that fail to produce an acceptable prototype in the Fall semester cannot earn an A for the semester.

i. 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

17. Make-up Exam Policy: No exams

18. Honesty Policy:
    All students admitted to the University of Florida have signed a statement of academic honesty committing them to be honest in all academic work and declaring an 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.

19. 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.

20. UF Counseling Services:
    Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
    - UF Counseling & Wellness Center, 3190 Radio Road (352) 392-1575 (352) 392-8452 fax, Personal counseling, career and academic support
    - 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.

21. Software Use:
    All faculty, staff and students 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.