

# Vg 100 Introduction to Engineering

UM-SJTU Joint Institute Summer 2017

## Instructors

### **Yanfeng Shen**

UM-SJTU Joint Institute  
Room 208 JI Building  
E-mail: yanfeng.shen@sjtu.edu.cn

### **Cynthia Vagnetti**

UM-SJTU Joint Institute  
Room 410 JI Building  
E-mail: cvagnetti@sjtu.edu.cn

## Teaching Assistants

### **Yuhan Chen**

E-mail: yuhanchen@sjtu.edu.cn

### **Xucheng Ma**

E-mail: ac12---@sjtu.edu.cn

### **Cunzhi Gao**

E-mail: gaocunzhi@sjtu.edu.cn

### **Weitao Sun**

E-mail: swtphoenix07@163.com

### **Yichen Yang**

E-mail: yangyichen0929@sjtu.edu.cn

## Lectures and Labs

Lectures: Mon. 14:00 – 15:40 (JI weeks: 5 to 10)

Tue. & Thurs. 14:00 – 15:40

East Middle Hall (东中院) E4-501

Labs: Mon. 12:10-13:50

Thurs. 12:10-13:50

4<sup>th</sup> Floor, (JI Building; JI General Engr. Lab).

## Office Hours

Name	Day and Time	Location
Yanfeng Shen	Tue. & Thur. 19:00-20:00 Or by appointment	208 JI building
Cynthia Vagnatti	Tue. & Mon. (5-10 wk) 12:30 – 13:30	410 JI building.
Xucheng Ma Yuhan Chen	Tue. Thurs. 18:00 – 20:00 Mon. 18:00 – 20:00 Tue. 20:00 – 22:00	E-reading room/discussion room
Yichen Yang Cunzhi Gao	Mon. 18 :30 – 21:30 Tue. 18 :30 – 21:30	JI third floor (writing center)
Weitao Sun	Thur. 18 :30 – 21:30 Or by appointment	JI third floor (writing center)

## Textbooks

No textbook is required for this class. Nonetheless, helpful readings are:

1. Andrea A. Lunsford, *The Everyday Writer with Exercises*, 5<sup>th</sup> Ed., Bedford/St. Martin's, 2013. (ISBN 978-1-4576-1267-1)
2. William Strunk, Jr., E. B. White, and Roger Angell, *The Elements of Style*, 4<sup>th</sup> Ed., Longman, 1999. (ISBN 0-205-30902-X)

## Course Description

In this course, we will learn and experience how engineers conceptualize the world and create things that can profoundly alter people's lives. In doing so, we find out that engineers bring much of their life and learning to bear on problem solving. It's not just math. It's not just science. The best of engineering often embraces one's life and passion to share with others, to help those in need, to improve our quality of life, and to encourage our exploration into the unknown. Our treatment of engineering in this section is broad based, and it covers a variety of case studies across a number of engineering disciplines. In doing so, we will explore how even the simplest of engineering designs can have outrageous consequences. We will consider why technical expertise by itself does not guarantee success. We will scrutinize how peer interactions can greatly influence the effectiveness of engineering solutions, in spite of superior technical proficiency. We will examine how adversity drives advancements in engineering in the real world.

There will be two team-based projects involved in this course. In the first project, students will design and build a strong and light-weight paper bridge crane using printing papers, DC motors, gearboxes, sensors, and a programmable micro controller unit (MCU). In the second project, students will design and build a simple mechatronic system with the same basic set of components that improves the quality of everyday life for people. Grading for both projects will be based on the innovativeness of the design, the performance of the prototype, and the quality of the written project reports. The second project will also be graded based on the quality of an oral presentation. Technical

communication is an integral part of the course. Students will have plenty of opportunities to improve their technical writing and oral presentation skills through various course assignments.

## Final Project Topics

There are several different projects and considerations for the Summer 2017 term at JI. Students are allowed to select a project based on the topics listed below. In few exceptional cases, students will be allowed to choose a topic outside of the topic list below. All topics are subject to pre-approval by the professor.

- **Entrepreneurship Project Series.** Several teams will be able to pursue a design project with an entrepreneurial focus. This term's theme for entrepreneurial projects is "Student Life," in which designs involve improving the life of our peers. JI students that have been accepted to U-M have the option of working with MPowered Entrepreneurship with the intent of continuing work started this term as a start-up business.

- **Greater Good Project Series.** Several teams will be able to pursue a design project with humanitarian focus. Projects with this focus have been well received in the communities that have asked for this kind of help. JI students that have been accepted to U-M have the option of continuing work like this through M-HEAL and BLUElab.

- **LifeHacks DIY Project Series.** Several teams will be able to pursue a "Do-It-Yourself" project using an Arduino board. People who are new to engineering have used this very small and inexpensive microcontroller. The tech makes for very cool stuff. Now's your chance to try.

## Course Grading Policy

<b>Individual Work</b>	<b>30%</b>
Homework	10%
Midterm Exam	15%
Peer and Course Evaluation	5%
<b>Team Work</b>	<b>70%</b>
Minutes/attendance	3%
Lab report/lab attendance	5%
Skill development session	2%
Project #1 Bridge Crane	
Performance (10%)	20%
Technical manual (10%)	
Project #2 Group Projects	
Final Report	10%
Oral Presentations	30%
(Formal pitch 5%, progress report presentation 5%, symposium presentation 10%, EXPO 10%)	

Note that the Professors will have the authority to offer bonus points to the students with outstanding contributions to the class activities and atmosphere. These bonus points are

cumulative and may lift the final letter grade. Your final letter grade will be determined based on your performance during the semester on all assignments and on the midterm. The weight of each is listed in the table above. Grading will follow a curve, set according to how students meet the course goals. Missing labs will cost 1% of the final grade. **The skill development session is compulsory. The purpose of these sessions are to help students realize the Technical Communication teamwork skills they will need to successfully accomplish each project.** You will be required to submit all your assignments both in paper form and electronically through Canvas, which automatically timestamps any work submitted. No late homework will be accepted. Missed work, including the exams, will receive zero credit. If you have legitimate excuses (medical emergency, death in the family, or other excuses deemed reasonable by the instructors), special arrangements may be made for you to submit your work at a later date. In such cases, you should discuss your options with the instructors before the deadline unless some unforeseen circumstance prohibits you from doing so. You may also be asked to show proofs, such as a doctor's note in case of medical emergency to substantiate your excuses. Attendance will be taken randomly with various mechanisms such as question and answer or in-class quizzes. Missing three times of random attendance check results in an automatic F in the course grade.

### Internet Resources

This class will use the Canvas Internet service extensively. All class handouts, extra reading materials, lecture notes, homework and project assignments, announcements, etc. will be posted in Canvas. In order not to miss any important class announcement, students are advised to check Canvas at least once per day. Students are also encouraged to use the Discussion and Chat Room functions of Canvas for discussions on issues related to the course. However, posting solutions to any of the class assignment on Canvas is prohibited and is considered as a violation of the Honor Code of the UM-SJTU Joint Institute.

### Honor Policies

All students in the class are presumed to be decent and honorable, and all students in the class are bound by the Honor Code of the UM-SJTU Joint Institute (visit <http://umji.sjtu.edu.cn/honorcode> for more details). You may not seek to gain an unfair advantage over your fellow students; you may not consult, look at, or possess the unpublished work of another without their permission; and you must appropriately acknowledge your use of another's work. Following are specific policies for different types of course assignments:

**Individual Assignments.** You may discuss individual assignments with your fellow students at the conceptual level, but must complete all calculations and write-up, from scratch to final form, on your own. Verbatim copying of another student's work is forbidden. You may not consult homework solutions from a previous term unless they are made available in a publicly accessible form (no unfair advantage can be sought).

**Team Assignments.** All group work is to be completed only within your own group. You may receive help from the course instructors and you may consult with members of other groups in the course, but you must complete your group's calculation and project write-up on your own.

**Exam.** Each student must complete the exam solely by her or his own efforts. Questions can be asked only of the course instructors. The exam must be completed within the specified time.

Any violation of the above honor policies appropriate to each piece of course work will be reported to the Honor Council, and if guilt is established penalties may be imposed. Such penalties can include, but are not limited to, letter grade deductions, disciplinary sanctions, or expulsion from the Institute and the University. **If you have any questions about this course policy, please consult the course instructors.**

### **Disability Policy**

If you have any disability that might interfere with your ability to turn in assignments on time or in the form required, please contact the instructors and the Academic & Student Affairs Office at the start of the term so that arrangements can be made to accommodate you.

### **Safety Issue**

Since you will work in the lab, special attention to safety operations is required. A dedicated section of safety training is included in the lecture. Students must obey the lab safety rules.

## Tentative Schedule

week	Day	Date	Prof./TA	Tentative Lecture Topics (T = Technical; C = Communication; D&P = Discussion and Presentation)	Assignment	Due
1	TU	May 16	Shen+Vagnetti	T1: Course introduction: Engineering	Photo and Name Roster	
	TH	May 18	Vagnetti	C1: Technical communication for the global Engineer (citation and plagiarism)	Summary	
	M	May 15		First week: no lab		
	TH	May 18		First week: no lab		
2	TU	May 23	Shen	T2: Project 1 description: the paper bridge crane. Brain storming; Lab Safety; Assign teams: team name, leader, logo		8:00 am Summary Roster
	TH	May 25	Vagnetti	C2: Manual writing: Integrating words and Images, expectations in minutes, paraphrasing.	Instruction Manual for project one	
	M	May 22	TAs	Lab 1: Lab orientation; Lecture and practice on Arduino to control motor, LED;		
	TH	May 25	TAs	TC input: Lab journal/log upload on Canvas every week!		
3	TU	May 30		Holiday for Dragon Boat Festival: No Class		Minutes
	TH	Jun 1	Shen	T3: Materials and Structures. Truss structure design: strong and light-weight. How to make an airplane!		
	M	May 27	TAs	Lab 2: Sensors and feedback on PC; Gears and Step Motors; Project 1: prototype the moving part of the bridge crane		
	TH	Jun 1	TAs			
4	TU	Jun 6	Vagnetti	C3: Introduction to Project Proposals How to sell your idea: Logo, Identity, and Audience.	Ideas and Pitch presentation for Project 2	Minutes
	TH	Jun 8	Shen	T4: Introduction to Mechatronics ; Actuators and Sensors		
	M	Jun 5	TAs	Lab 3: Project 1: prototype the bridge truss structure – Static tests		
	TH	Jun 8	TAs			
5	M	Jun 12	Vagnetti	C4: The Good Writing: Review of everything you learned in Vy100/ Vy200		
	TU	Jun 13	Shen	T5: Tables and Measurements Plots		Minutes
	TH	Jun 15	Vagnetti	C5: Technical Presentations and Effective Slides: Visual and Spoken Rhetorics		
	M	Jun 12	TAs	Lab 4: Test of bridge crane structures (All TEAMS)		
	TH	Jun 15	TAs	<b>Lab 5: Game Day (All TEAMS)!</b>		
6	M	Jun 19	Shen	T6: Intro to descriptive statistics	HMWK	
	TU	Jun 20	Shen+Vagnetti	D&P 1: Pitch Day for Project 2 (8 groups): oral presentations: 5 min. each group, max 5 slides + one title slide		Minutes
	TH	Jun 22	Shen+Vagnetti	D&P 2: Pitch Day for Project 2 (8 groups): oral presentations: 5 min. each group, max 5 slides + one title slide		Project 1: instruction manual

	M	Jun 19	TAs	Lab 6: Scheduling and assessment of Project 2. [TA verify sketch design and give suggestions]. Start Purchasing		
	TH	Jun 22	TAs			
7	M	Jun 26	Vagnetti	C6: Time Management: Gantt Chart	Progress report and presentation	
	TU	Jun 27	Shen	T7: Smart Materials and Structures		Minutes
	TH	Jun 29	Shen+Vagnetti	T8+C7: Mid Term Exam Review		HMWK;
	M	Jun 26	TAs	Lab 7: TA gives guidelines in purchasing materials. Finish purchasing		
	TH	Jun 29	TAs			
8	M	July 3		<b>Midterm Exam</b>		
	TU	July 4	Vagnetti	C8: Poster Presentation	Symposium practice talk; Poster Presentation; Final Report	Minutes
	TH	July 6	Shen	T9: Advancements in Engineering: Forefronts, Successes, and Failures		
	M	July 3	TAs	Lab 8: TC Lab: giving guidance and suggestions for progress presentation (rehearsal) by registration		
	TH	July 6	TAs			
9	M	July 10	Shen+Vagnetti	D&P3: Progress Report and prototypes		Project 2 progress presentation
	TU	July 11	Shen+Vagnetti	D&P4: Progress Report and prototypes		Minutes
	TH	July 13	Vagnetti	C9: Final report		
	M	July 10	TAs	Lab 9: TC Lab: TAs guide them to prepare for the symposium talk (rehearsal) and poster		
	TH	July 13	TAs			Poster due on Friday night 07-15
10	M	July 17	Shen+Vagnetti	D&P5: Symposium practice talk (15 min)		
	TU	July 18	Shen+Vagnetti	D&P6: Symposium practice talk (15 min)		Minutes
	TH	July 20	Shen+Vagnetti	D&P7: Symposium practice talk (15 min)		
	M	July 17	TAs	Lab 10: TC Lab for final report		
	TH	July 20	TAS			
	SA	July 22	ALL and Parents	<b>Tentative Symposium Day</b>		
11	TU	July 25	Shen+Vagnetti	D&P8: Peer Review: How to Give Comments		Minutes Poster to Canvas
	TH	July 27	Shen+Vagnetti	D&P9: Peer Review: How to Address Reviewers' Concerns		Final Report Draft
	M	July 24	TAs	Lab 11: Finalizing product		
	TH	July 27	TAs			

12	TU	Aug 1	Shen+ Vagnetti	D&P10: Peer review of final report draft		Minutes
	TH	Aug 3	Shen+ Vagnetti	D&P11: Poster Competition + Wrap up		Poster and Product
	M	July 31	TAs	Lab 12: Get Ready for Expo (Technical and TC TAs all attend)		
	TH	Aug 3	TAs			
13		TBD		<b>Design Expo</b>		Final Report; Minutes; Gantt Chart listing duties and contribution from each team member included in appendix