MEC 316: Mechanical Engineering Laboratory I

Fall 2017

Instructors: Profs. David Hwang (in charge), and Ta-Yung Hsu
General course related questions to be addressed to Prof. David Hwang by
(email) david.hwang@stonybrook.edu

Office hours:
Thermo-Fluid Part (Lab 1-3 & 7-8): Prof. Hwang (222 Heavy Engineering), Mon., 1:00 - 4:00 pm
Solid Part (Lab 4-6, 9-10): Prof. Hsu (129 Light Engineering), Mon., 1:00-4:00 pm

Laboratory Manager: Ta-Yung Hsu

Teaching Assistants: Aktaruzzaman Al Hossain (Fluid Labs 1-3 & 7-8), Shaoyu Hou (Solid Labs 4-6, 9-10),

Course Objectives:
Students are introduced to a variety of sensors and instruments commonly used in mechanical engineering practice. The lectures provide background on the general principles of measurement systems and their performance characteristics. Measurements of different physical quantities will also be discussed in the class. The laboratory experiments provide hands-on experience in the use of several sensors and instruments that form the basis for the laboratory courses MEC 317 and MEC 417 where the use of these instruments is needed for more advanced experiments. Students are required to learn the basics of probability and statistics as well. Students shall:

1. Learn to apply mathematics, physics, chemistry, and engineering principles to measurement problems in mechanical engineering;
2. Design and conduct experiments and interpret data;
3. Learn modern measurement techniques as applied to thermal and mechanical systems;
4. Identify, formulate, and solve engineering problems;
5. Learn to communicate effectively;

Reference book:
Hardcopy of Lab Manual will be distributed, and necessary materials will be uploaded on Blackboard.

Lab fee:
Each student pays course fee of $100.

Time and Place: Lectures: 12:00 – 12:53 pm Mon, Room 143 Engineering
Labs: 2:30 – 4:30 pm Tu. & Th., 206 Heavy Engineering
(***See detailed schedule on next page for complete information***)

List of 10 labs:
1. **Lab 1:** Temperature measurement
2. **Lab 2:** Pressure and velocity measurement
3. **Lab 3:** Mass-flow measurement
4. **Lab 4:** Natural vibration modes of a cantilever beam
5. **Lab 5:** Straightness measurement of linear motion
6. **Lab 6:** Strain Measurements
7. **Lab 7:** Temperature measurement from hot surfaces
8. **Lab 8:** Labview based liquid flow control
9. **Lab 9:** Calibration of a linear variable differential transformer

10. Lab 10: Labview based DC voltage and AC signal measurements

Instrumentation Project: Scale device design Project; final presentation and project required

Grading Policy: To pass this course

- All 10 labs must be completed and lab report should be submitted till next lab session; typically in one week (Each Laboratories & Reports takes 8%): 80% in total for 10 lab reports
- Instrumentation project must be completed. Final presentation (5%) and **f**inal report (15%) should be submitted : 20% in total for project presentation and report

Disability Support Services (DSS) Statement:

If you have a physical, psychological, medical or learning disability that may impact your course work, please contact Disability Support Services, ECC (Educational Communications Center) Building, room128, (631) 632-6748. They will determine with you what accommodations, if any, are necessary and appropriate. All information and documentation is confidential. Students who require assistance during emergency evacuation are encouraged to discuss their needs with their professors and Disability Support Services. For procedures and information go to the following website: http://www.stonybrook.edu/ehs/fire/disabilities.

Academic Integrity Statement:

Each student must pursue his or her academic goals honestly and be personally accountable for all submitted work. Representing another person's work as your own is always wrong. Faculty are required to report any suspected instances of academic dishonesty to the Academic Judiciary. Faculty in the Health Sciences Center (School of Health Technology & Management, Nursing, Social Welfare, Dental Medicine) and School of Medicine are required to follow their school-specific procedures. For more comprehensive information on academic integrity, including categories of academic dishonesty, please refer to the academic judiciary website at http://www.stonybrook.edu/uaa/academicjudiciary/.

Critical Incident Management:

Stony Brook University expects students to respect the rights, privileges, and property of other people. Faculty are required to report to the Office of Judicial Affairs any disruptive behavior that interrupts their ability to teach, compromises the safety of the learning environment, or inhibits students' ability to learn. Faculty in the HSC Schools and the School of Medicine are required to follow their school-specific procedures.

Detailed Schedule for MEC316 - Fall 2017

	Monday (Lecture) 12:00-12:53 pm 145 Engineering	Tuesday (Lab) 2:30 – 4:30 pm 206 Heavy Engineering	Thursday (Lab) 2:30 – 4:30 pm 206 Heavy Engineering
Week 1 (08/28-09/03)	**28-August** **Intro, Group, Project, Safety (Hwang)**	**29-August** **Lab 1-10 Overview (Hwang, Hsu)**	**31-August** **Lab 1-10 Overview (Hwang, Hsu)**
Week 2 (09/04-09/10)	**4-September** **Holiday (Labor Day)**	**5-September** **No Class (University Calendar)**	**7-September** **LabView 1 : Group 21-40 (Hwang, Hsu)**
Week 3 (09/11-09/17)	**11-September** **Instrumentation Design Project (Hsu)**	**12-September** **LabView 1 : Group 1-20 (Hwang, Hsu)**	**14-September** **LabView 2 : Group 21-40 (Hwang, Hsu)**
Week 4 (09/18-09/24)	**18-September** **Error Analysis (Hwang)**	**19-September** **LabView 2 : Group 1-20 (Hwang, Hsu)**	**21-September** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 5 (09/25-10/01)	**25-September** **Complimentary if necessary (TBA)**	**26-September** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**28-September** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 6 (10/02-10/08)	**2- October**	**3-October** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**5-October** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 7 (10/09-10/15)	**9-October**	**10-October** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**12-October** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 8 (10/16-10/22)	**16-October**	**17-October** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**19-October** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 9 (10/23-10/29)	**23-October**	**24-October** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**26-October** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 10 (10/30-11/05)	**30-October**	**31-October** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**2-November** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 11 (11/06-11/12)	**6-November**	**7-November** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**9-November** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 12 (11/13-11/19)	**13-November**	**14-November** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**16-November** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 13 (11/20-11/26)	**20-November**	**21-November** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**23-November** **Holiday** **(Thanksgiving)**
Week 14 (11/27-12/03)	**27-November**	**28-November** **Lab 1-10** **Group 1-20 (Hwang, Hsu)**	**30-November** **Lab 1-10** **Group 21-40 (Hwang, Hsu)**
Week 15 (12/04-12/10)	**4-December** **Project Presentation (more time slots to be set up, if necessary)**	**5-December** **Project Presentation** **(more time slots to be set up, if necessary)**	**7-December** **Design Project Presentation** **(more time slots to be set up, if necessary)**

Lab Schedule for each Group

Tuesday Group

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10
Week 5 TUE (09/26)	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20
Week 6 TUE (10/3)	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18
Week 7 TUE (10/10)	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16
Week 8 TUE (10/17)	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14
Week 9 TUE (10/24)	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12
Week 10 TUE (10/31)	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10
Week 11 TUE (11/07)	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8
Week 12 TUE (11/14)	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4	Group 5 Group 6
Week 14 TUE (11/21)	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2	Group 3 Group 4
Week 15 TUE (11/28)	Group 3 Group 4	Group 5 Group 6	Group 7 Group 8	Group 9 Group 10	Group 11 Group 12	Group 13 Group 14	Group 15 Group 16	Group 17 Group 18	Group 19 Group 20	Group 1 Group 2

Thursday Group

	Lab 1	Lab 2	Lab 3	Lab 4	Lab 5	Lab 6	Lab 7	Lab 8	Lab 9	Lab 10
Week 5 THU (09/21)	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40
Week 6 THU (09/28)	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38
Week 7 THU (10/5)	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36
Week 8 THU (10/12)	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34
Week 9 THU (10/19)	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32
Week 10 THU (10/26)	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30
Week 11 THU (11/02)	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28
Week 12 THU (11/09)	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24	Group 25 Group 26
Week 14 THU (11/16)	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22	Group 23 Group 24
Week 15 THU (11/30)	Group 23 Group 24	Group 25 Group 26	Group 27 Group 28	Group 29 Group 30	Group 31 Group 32	Group 33 Group 34	Group 35 Group 36	Group 37 Group 38	Group 39 Group 40	Group 21 Group 22