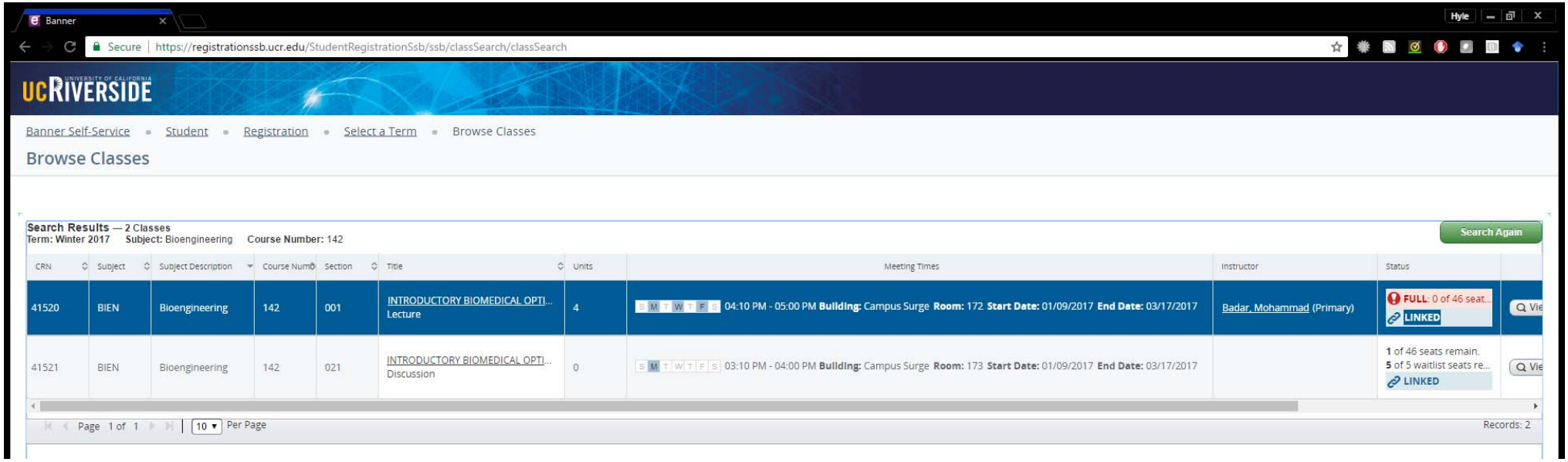
General course information



- Instructor: B. Hyle Park (MSE 243 / Bourns B207, hylepark@engr.ucr.edu)
- Teaching assistant: Junchao Wang (MSE 217, jwang071@ucr.edu)
- Reader: Michael Xiong (MSE 217, zhehao.xiong@email.ucr.edu)

Course objectives

"BIEN 142 Introductory Biomedical Optical Imaging, 4 units, Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040C and MATH 010B; or consent of instructor. Examines fundamental theory and basic design of biomedical optical imaging systems. Topics include a basic understanding of the working principles of optical components, diagnostic light-tissue interaction, and design of imaging systems to exploit the interaction of light with biological phenomena."

1. Basic understanding of principles of optical image acquisition, interpretation, and analysis

Course objectives

"BIEN 142 Introductory Biomedical Optical Imaging, 4 units, Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040C and MATH 010B; or consent of instructor. Examines fundamental theory and basic design of biomedical optical imaging systems. Topics include a basic understanding of the working principles of optical components, diagnostic light-tissue interaction, and design of imaging systems to exploit the interaction of light with biological phenomena."

1. Basic understanding of principles of optical image acquisition, interpretation, and analysis
2. MATLAB!
3. Gain familiarity with current optical imaging technology

Deliverables and grading

Homework

- HW01 (10%)
- HW02 (10%)
- HW03 (10%)
- HW04 (10%)

General conduct (20%)

- Late homework will graded but will not count toward your grade

Midterm (25%)

Final (25%)

Schedule

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 0							
Week 1	1/8/2017	1/9/2017 LEC 01: 4:10-5pm SURGE 172 Overview	1/10/2017	1/11/2017 LEC 02: 4:10-5pm SURGE 172 *Properties of light*	1/12/2017	1/13/2017 LEC 03: 4:10-5pm SURGE 172 *Light manipulation I*	1/14/2017
Week 2	1/15/2017	1/16/2017 *holiday*	1/17/2017	1/18/2017 LEC 04: 4:10-5pm SURGE 172 *Light manipulation II* **HW1 assigned**	1/19/2017	1/20/2017 LEC 05: 4:10-5pm SURGE 172 *Light-matter interaction*	1/21/2017
Week 3	1/22/2017	1/23/2017 DIS 01: 3:10-4pm SURGE 173 LEC 06: 4:10-5pm SURGE 172 *Basic image formation*	1/24/2017	1/25/2017 LEC 07: 4:10-5pm SURGE 172 *Single lens cameras*	1/26/2017 Extract quantitiative parameters	1/27/2017 **HW1 due** LEC 08: 4:10-5pm SURGE 172 *Image analysis I*	1/28/2017
Week 4	1/29/2017	1/30/2017 *away* DIS 02: 3:10-4pm SURGE 173 **HW2 assigned**	1/31/2017	2/1/2017 *away*	2/2/2017	2/3/2017 LEC 09: 4:10-5pm SURGE 172 *Microsope design*	2/4/2017
Week 5	2/5/2017	2/6/2017 DIS 03: 3:10-4pm SURGE 173 LEC 10: 4:10-5pm SURGE 172 *System characterization*	2/7/2017	2/8/2017 LEC 11: 4:10-5pm SURGE 172 *Image analysis II*	2/9/2017	2/10/2017 **HW2 due** LEC 12: 4:10-5pm SURGE 172 *Review*	2/11/2017
Week 6	2/12/2017	2/13/2017 **Midterm**: 3:10-4pm SURGE 173 **Midterm**: 4:10-5pm SURGE 172	2/14/2017	2/15/2017 LEC 13: 4:10-5pm SURGE 172 **HW3 assigned** *Fluorescence microscopy*	2/16/2017	2/17/2017 LEC 14: 4:10-5pm SURGE 172 *Confocal microscopy*	2/18/2017
Week 7	2/19/2017	2/20/2017 *holiday*	2/21/2017	2/22/2017 LEC 15: 4:10-5pm SURGE 172 *Multiphoton microscopy*	2/23/2017	2/24/2017 LEC 16: 4:10-5pm SURGE 172 *Spectroscopy*	2/25/2017

Schedule

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Week 4	1/29/2017	1/30/2017 *away* DIS 02: 3:10-4pm SURGE 173 **HW2 assigned**	1/31/2017	2/1/2017 *away*	2/2/2017	2/3/2017 LEC 09: 4:10-5pm SURGE 172 *Microsope design*	2/4/2017
Week 5	2/5/2017	2/6/2017 DIS 03: 3:10-4pm SURGE 173 LEC 10: 4:10-5pm SURGE 172 *System characterization*	2/7/2017	2/8/2017 LEC 11: 4:10-5pm SURGE 172 *Image analysis II*	2/9/2017	2/10/2017 **HW2 due** LEC 12: 4:10-5pm SURGE 172 *Review*	2/11/2017
Week 6	2/12/2017	2/13/2017 **Midterm**: 3:10-4pm SURGE 173 **Midterm**: 4:10-5pm SURGE 172	2/14/2017	2/15/2017 LEC 13: 4:10-5pm SURGE 172 **HW3 assigned** *Fluorescence microscopy*	2/16/2017	2/17/2017 LEC 14: 4:10-5pm SURGE 172 *Confocal microscopy*	2/18/2017
Week 7	2/19/2017	2/20/2017 *holiday*	2/21/2017	2/22/2017 LEC 15: 4:10-5pm SURGE 172 *Multiphoton microscopy*	2/23/2017	2/24/2017 LEC 16: 4:10-5pm SURGE 172 *Spectroscopy*	2/25/2017
Week 8	2/26/2017	2/27/2017 DIS 05: 3:10-4pm SURGE 173 LEC 17: 4:10-5pm SURGE 172 *Fiber optics*	2/28/2017	3/1/2017 LEC 18: 4:10-5pm SURGE 172 *Time-domain OCT*	3/2/2017	3/3/2017 **HW3 due** LEC 19: 4:10-5pm SURGE 172 *Fourier-domain OCT*	3/4/2017
Week 9	3/5/2017	3/6/2017 DIS 06: 3:10-4pm SURGE 173 LEC 20: 4:10-5pm SURGE 172 **HW4 assigned**; *Endoscopy*	3/7/2017	3/8/2017 LEC 21: 4:10-5pm SURGE 172 *Flow imaging*	3/9/2017	3/10/2017 LEC 22: 4:10-5pm SURGE 172 *Polarization imaging*	3/11/2017
Week 10	3/12/2017	3/13/2017 DIS 07: 3:10-4pm SURGE 173 LEC 23: 4:10-5pm SURGE 172 *Clinical systems*	3/14/2017	3/15/2017 LEC 24: 4:10-5pm SURGE 172 *Research systems*	3/16/2017	3/17/2017 **HW4 due** LEC 25: 4:10-5pm SURGE 172 *Review*	3/18/2017
Finals	3/19/2017	3/20/2017 **Final**: 7-10pm SURGE 172	3/21/2017	3/22/2017	3/23/2017	3/24/2017	3/25/2017

Office hours

- Tuesdays, 11am-noon, MSE 243

Matlab installation

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- Installation ins
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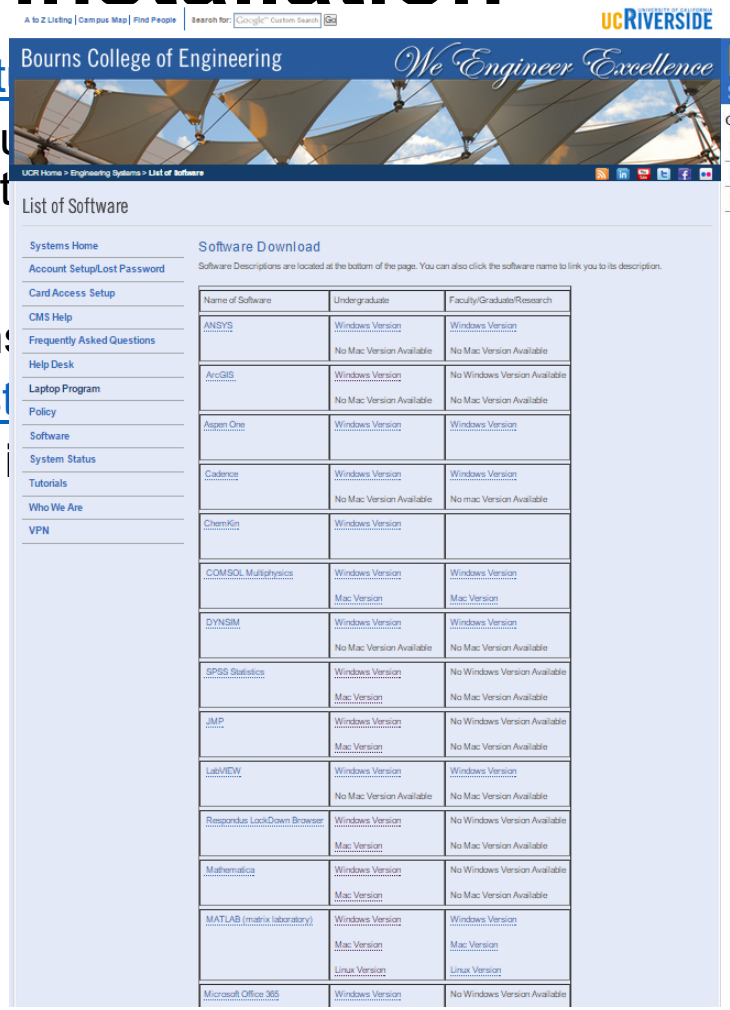
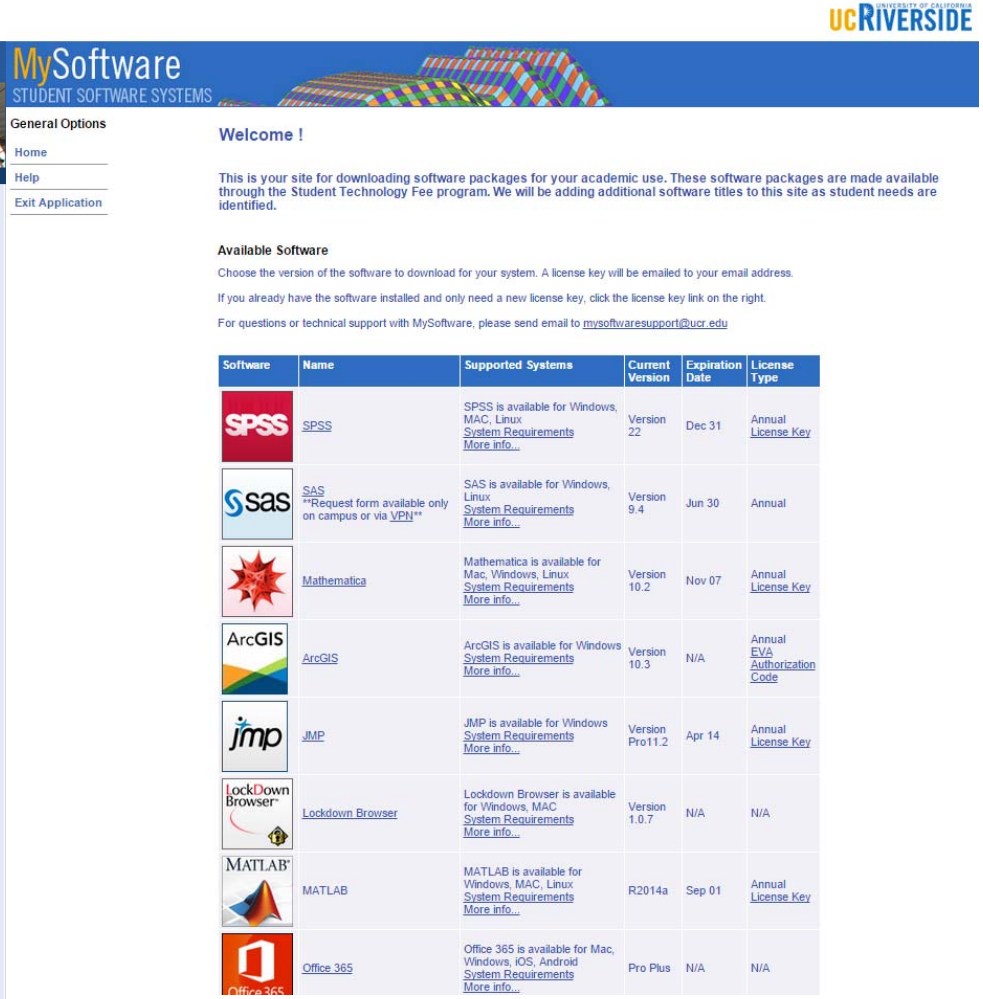
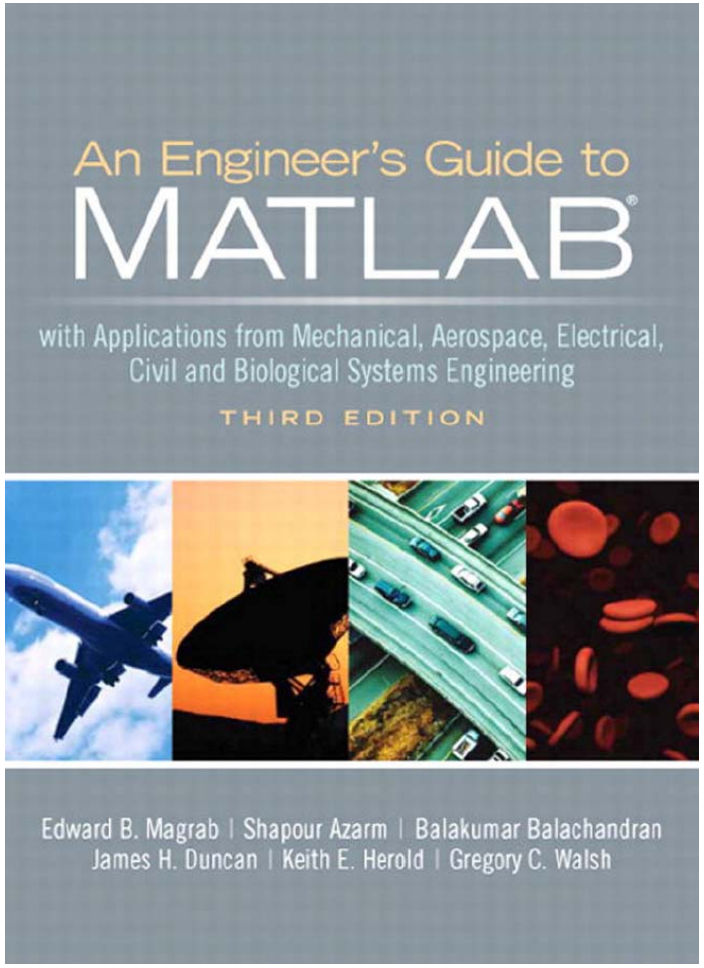
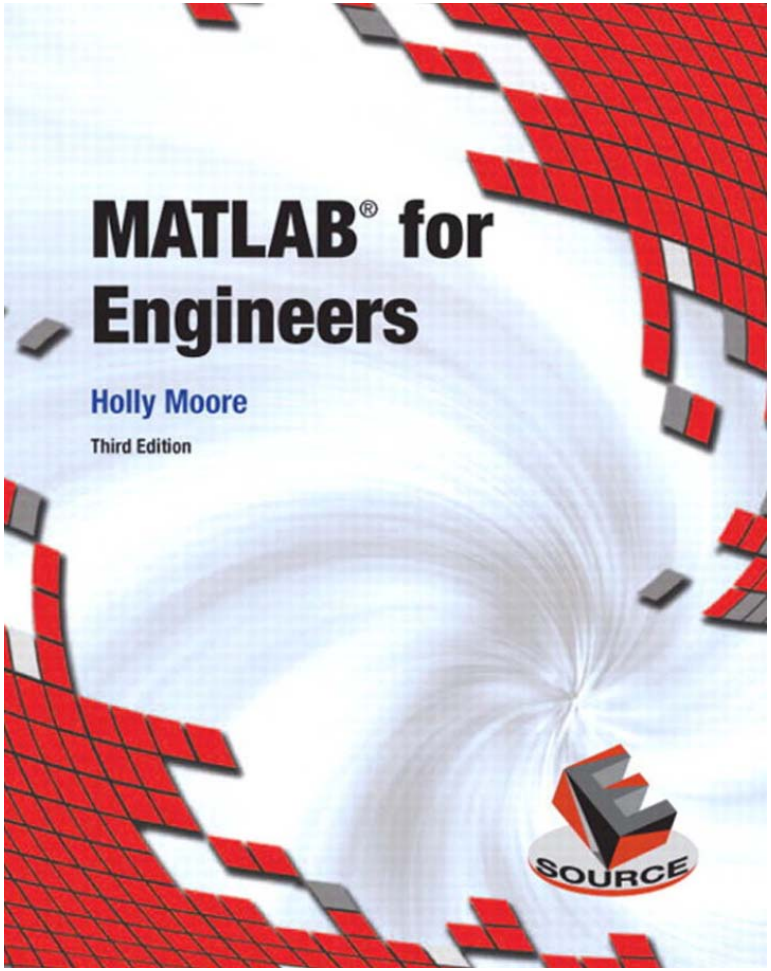




Supplemental reading





Supplemental reading