Description of Course
This course introduces the focus areas within the Biosystems Engineering department and introduces career development skills. Through a survey of the focus areas of the department, students will participate in lectures, tours, visits, hands-on activities, and presentations by alumni. Emphasis is placed on building critical thinking skills to solve problems in the biosystems fields. Discussion topics include internship opportunities and professionalism. Laboratory exercises may include assembling a landscape irrigation system, demonstrating drones, using sensors and controls in controlled environment agriculture settings, using an Arduino or Raspberry Pi to control a device, and biological sensing. Presentations, guest speakers, discussions, and writing exercises provide communication experiences.

Course Prerequisites or Co-requisites
MATH 122B or MATH 124 or MATH 125 or permission of Academic Advisor

Instructors and Contact Information
Dr. Akrum H. Tamimi, Professor of Practice; Forbes Bldg. #36, room 140; 520-621-9663; akrumt@arizona.edu
Office Hours: “Open Door Policy”; I am on campus all weekdays, please make an appointment via email to make sure I am in my office. Zoom can be used for appointments.

Ms. Dava Jondall, Academic Program Manager; 425C Shantz, 520-621-1753; davaj@arizona.edu
Office Hours: by appointment

D2L: https://d2l.arizona.edu/d2l/home/1048523 or Homepage - BAT BE 201 FA21 001 301 (arizona.edu)

Course Format and Teaching Methods
This is a flipped class. It will be taught in a collaborative, interactive way. Part of the homework and activities will be completed outside the class and other parts will be conducted and completed during class time. Therefore, to get credit for in-class work students need to be present in class.

Students are responsible to check materials, assignments, quizzes, and announcements posted to D2L on a regular basis. Materials will be posted to D2L before it is covered in class. The students will be required to review the materials and take quizzes before class time. In class, a short lecture will be presented emphasizing the main points and to answer students’ questions. Quizzes and/or a Questions Game will be conducted to emphasize learning objectives for the lecture. Students are required to participate in the discussion and in the quizzes and Questions Games as part of groups to get credit. Students will be able to ask questions about the homework assignments related to the out-of-class building circuits activities and assignments.

Course Objectives
1. Department of Biosystems Engineering themes and research topics
2. Research labs and fabrication facilities available to students
3. Biological and microbiological skills
4. Monitoring systems and environmental factors
5. Career development, internships, and public speaking skills

Expected Learning Outcomes
At the conclusion of the course, students will be able to

1. Identify and build simple sensors and controls to measure and monitor agricultural, control environment agricultural, and environmental factors utilizing Raspberry Pi
2. Practice critical thinking skills to solve biological challenges and apply in professional development
3. Define Renewable Energy and Organic Residuals concepts
4. Recognize Controlled Environment Agriculture elements and processes
5. Use Biosystems Analytics and Technology tools
6. Identify with data science and number crunching tools
7. Describe the use of Drones in biosystems engineering and data analytics
8. Utilize biosensors in monitoring biosystems
9. Articulate the potential of associating big data gathering using biosystems technology, data science, and analytics

Absence and Class Participation Policy

The UA policy regarding absences for any sincerely held religious belief, observance or practice will be accommodated where reasonable, [http://policy.arizona.edu/human-resources/religious-accommodation-policy](http://policy.arizona.edu/human-resources/religious-accommodation-policy).

Absences pre-approved by the UA Dean of Students (or Dean Designee) will be honored. See: [https://deanofstudents.arizona.edu/absences](https://deanofstudents.arizona.edu/absences)

Participating in the course and attending lectures and other course events are vital to the learning process. As such, attendance is required at all lectures and discussion section meetings. Absences may affect a student’s final course grade. If you anticipate being absent, are unexpectedly absent, or are unable to participate in class online activities, please contact me as soon as possible. To request a disability-related accommodation to this attendance policy, please contact the Disability Resource Center at (520) 621-3268 or [drc-info@email.arizona.edu](mailto:drc-info@email.arizona.edu). If you are experiencing unexpected barriers to your success in your courses, the Dean of Students Office is a central support resource for all students and may be helpful. The Dean of Students Office is located in the Robert L. Nugent Building, room 100, or call 520-621-7057.

Makeup Policy for Students Who Register Late
If you register after the first class meeting, you can make up missed assignments/quizzes and the deadline for doing so will be determined case-by-case. Please talk to the instructor to determine those due dates.

Course Communications
Official UA e-mail address and the course D2L

Required Texts or Readings
No textbook is required for this course. Handouts in the form of PDF files for specific topics will be provided by the instructor via D2L.
Required or Special Materials
You are expected to bring a laptop to every class meeting. The laptop will be used for Zoom Classes, taking quizzes including a daily attendance quiz and to work on and submit your individual and group in-class assignments. In addition, you are required to purchase a Raspberry Pi package. Circuit elements, sensors, and controls will be provided by the instructor.

Raspberry Pi 3 basic starter kit
• Raspberry Pi 3
• Heat sinks
• Power cable
• Case

More Information on how and where to purchase those materials will be provided on D2L.

Required Extracurricular Activities
Students are expected to build few biosystems tools during the semester to develop hands-on experience based on the course learning objectives. Virtual and actual tours and visits will be part of this class.

Assignments and Examinations: Schedule/Due Dates
The schedule listed below shows assignments for each week. Quizzes are due at the end of the day they are assigned. Other homework assignments are usually due one week after assignment is assigned. There will be a final project which is part of career development module. There will be assignments for every week as shown in the schedule below.
You can request a review of your grade for any homework, quiz, or activity. You have two weeks to discuss your grade after the due materials are graded and returned. There will be no credit for late quizzes, homework, and assignments.

Final Examination or Project
The date and time of the final exam are as per UA Academic calendar and will be announced in class. Due dates for project presentation, evaluation, and report submission are per schedule shown below. Please see Final Exam Regulations, https://www.registrar.arizona.edu/courses/final-examination-regulations-and-information, and Final Exam Schedule, http://www.registrar.arizona.edu/schedules finals.htm

There will be no final exam for this course.

Grading Scale and Policies
Grade distribution for the course are shown in the table below. University policy regarding grades and grading systems is available at http://catalog.arizona.edu/policy/grades-and-grading-system

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<th>Module (Topic)</th>
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<tr>
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<td>Attendance / Participation</td>
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<td>2</td>
<td>Career Development</td>
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<td>3</td>
<td>Controlled Environment Agriculture</td>
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<td>4</td>
<td>Biosystems Analytics</td>
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<td>5</td>
<td>Sensors and Controls</td>
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<td>Biosensors</td>
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<td>7</td>
<td>Water Resources / Irrigation</td>
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<td>8</td>
<td>Renewable Energy</td>
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<td>9</td>
<td>BE Fabrication Tour</td>
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<td>10</td>
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Incomplete (I) or Withdrawal (W):
Requests for incomplete (I) or withdrawal (W) must be made in accordance with University policies, which are available at http://catalog.arizona.edu/policy/grades-and-grading-system#incomplete and http://catalog.arizona.edu/policy/grades-and-grading-system#Withdrawal, respectively.

Dispute of Grade Policy
All grades can be disputed within 2 weeks of posting them on D2L.

Scheduled Topics/Activities
Schedule of topics and activities is shown on the next page.

Classroom Behavior Policy
To foster a positive learning environment, students and instructors have a shared responsibility. We want a safe, welcoming, and inclusive environment where all of us feel comfortable with each other and where we can challenge ourselves to succeed. To that end, our focus is on the tasks at hand and not on extraneous activities (e.g., texting, chatting, reading a newspaper, making phone calls, web surfing, etc.).

Students are asked to refrain from disruptive conversations with people sitting around them during lecture. Students observed engaging in disruptive activity will be asked to cease this behavior. Those who continue to disrupt the class will be asked to leave lecture or discussion and may be reported to the Dean of Students.

Threatening Behavior Policy
The UA Threatening Behavior by Students Policy prohibits threats of physical harm to any member of the University community, including to oneself. See http://policy.arizona.edu/education-and-student-affairs/threatening-behavior-students.

Accessibility and Accommodations
Please visit Disability Resource Center website: http://drc.arizona.edu/instructors/syllabus-statement.

Code of Academic Integrity
Students are encouraged to share intellectual views and discuss freely the principles and applications of course materials. However, graded work/exercises must be the product of independent effort unless otherwise instructed. Students are expected to adhere to the UA Code of Academic Integrity as described in the UA General Catalog. See:
http://deanofstudents.arizona.edu/academic-integrity/students/academic-integrity.

The University Libraries have some excellent tips for avoiding plagiarism, available at http://new.library.arizona.edu/research/citing/plagiarism.

Selling class notes and/or other course materials to other students or to a third party for resale is not permitted without the instructor’s express written consent. Violations to this and other course rules are subject to the Code of Academic Integrity and may result in course sanctions. Additionally, students who use D2L or UA e-mail to sell or buy these copyrighted materials are subject to Code of Conduct Violations for misuse of student e-mail addresses. This conduct may also constitute copyright infringement.
All information presented in the table shown above will be presented in D2L with details.

UA Nondiscrimination and Anti-harassment Policy

The University is committed to creating and maintaining an environment free of discrimination; see [http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy](http://policy.arizona.edu/human-resources/nondiscrimination-and-anti-harassment-policy)

Our classroom is a place where everyone is encouraged to express well-formed opinions and their reasons for those opinions. We also want to create a tolerant and open environment where such opinions can be expressed without resorting to bullying or discrimination of others.

Additional Resources for Students

UA Academic policies and procedures are available at [http://catalog.arizona.edu/policies](http://catalog.arizona.edu/policies)

Student Assistance and Advocacy information is available at [http://deanofstudents.arizona.edu/student-assistance/students/student-assistance](http://deanofstudents.arizona.edu/student-assistance/students/student-assistance)
Confidentiality of Student Records

Subject to Change Statement
Information contained in the course syllabus, other than the grade and absence policy, may be subject to change with advance notice, as deemed appropriate by the instructor.