

## Course Administration

|                       |  |          |     |         |     |         |     |                       |     |
|-----------------------|--|----------|-----|---------|-----|---------|-----|-----------------------|-----|
| COURSE DESCRIPTION    | Introduction, mechanism structure, basic concepts of mechanisms, canonical representation of motion. Kinematic analysis, algebraic method, vector-loop method, complex number method, spherical and spatial polygon method, matrix method, dual-number quaternion method, screw coordinate method, line coordinate method, computer-aided mechanisms analysis and synthesis.   |          |     |         |     |         |     |                       |     |
| LEARNING OBJECTIVES   | Understand the theory and methods for kinematic analysis and synthesis. Use a linkage design software tool to complete a design project.   |          |     |         |     |         |     |                       |     |
| INSTRUCTOR:           | Jeff Ge, 113 Light Engineering, (631) 632 8305.<br>E-mail: <a href="mailto:Qiaode.Ge@stonybrook.edu">Qiaode.Ge@stonybrook.edu</a>  |          |     |         |     |         |     |                       |     |
| LECTURE HOURS:        | Monday (2:40 PM – 5:30 PM) (N101 Social Behavior Science Building).  |          |     |         |     |         |     |                       |     |
| OFFICE HOURS:         | Monday (1:00 PM – 2:00 PM) Tuesday (1:00pm --3:00pm) (tentative) or by appointment (113 Light Engineering).  |          |     |         |     |         |     |                       |     |
| REQUIRED TEXT:        | <b>Geometric Design of Linkages</b> , J. Michael McCarthy, Gim Song Soh, 2nd ed., Springer,  |          |     |         |     |         |     |                       |     |
| PREREQUISITES:        | An undergraduate course on mechanism design and analysis.  |          |     |         |     |         |     |                       |     |
| HOMEWORK:             | About one homework assignment per week.<br>Homework is due one week after it is assigned. Late homework will <b>not</b> be accepted, unless you have made prior arrangements with the instructor.  |          |     |         |     |         |     |                       |     |
| PROJECTS:             | One design project with a prototype, oral presentation, and a written report.  |          |     |         |     |         |     |                       |     |
| EXAMS:                | <b>Midterm: Monday 10/25/2021 during class.</b><br><b>Final Exam: Wednesday 12/8/2021, 5:30PM – 8:00 PM.</b><br>• No makeup exam unless arranged prior to the exam.  |          |     |         |     |         |     |                       |     |
| GRADING:              | Semester letter grade is based upon your performance in the following: <table border="0" style="margin-left: 20px;"> <tr> <td>Homework</td> <td style="text-align: right;">10%</td> </tr> <tr> <td>Project</td> <td style="text-align: right;">25%</td> </tr> <tr> <td>Midterm</td> <td style="text-align: right;">25%</td> </tr> <tr> <td>Final (comprehensive)</td> <td style="text-align: right;">40%</td> </tr> </table> | Homework | 10% | Project | 25% | Midterm | 25% | Final (comprehensive) | 40% |
| Homework              | 10%  |          |     |         |     |         |     |                       |     |
| Project               | 25%  |          |     |         |     |         |     |                       |     |
| Midterm               | 25%  |          |     |         |     |         |     |                       |     |
| Final (comprehensive) | 40%  |          |     |         |     |         |     |                       |     |

## Tentative Schedule

| WEEK     | MATERIAL COVERED                                      | Text Chapters |
|----------|---|---------------|
| 1        | Introduction and Kinematics Fundamentals              | Ch. 1         |
| 2,3      | Analysis of Planar Linkages                           | Ch. 2         |
| 4        | Graphical Synthesis in the Plane                      | Ch. 3         |
| 5        | Planar Kinematics                                     | Ch. 4         |
| 6        | Algebraic Synthesis of Planar Chains                  | Ch. 5         |
| 7        | Multiloop Planar Linkages<br>Design Project assigned. | Ch. 6         |
| <b>8</b> | <b>Midterm (10/25)</b>                                |               |
| 9        | Analysis of Spherical Linkages                        | Ch. 7         |
| 10       | Spherical Kinematics                                  | Ch. 8         |
| 11       | Analysis of Spatial Chains                            | Ch. 11        |
| 12       | Spatial Kinematics                                    | Ch. 12        |
| 13-14    | Analytic Synthesis of Spatial Chains                  | Ch. 13-16     |
| 15       | Design project due and presentation                   |               |

**Final Exam (comprehensive): Wednesday 12/8/2021, 5:30 PM – 8:00 PM in the same classroom.**

## **Blackboard**

All homework assignments and solutions will be posted on the Blackboard course account. For problems logging in, go to the helpdesk in the Main Library SINC Site or the Union SINC Site, you can also call: 631-632-9602 or e-mail: [helpme@ic.sunysb.edu](mailto:helpme@ic.sunysb.edu)

I will use email and blackboard exclusively to communicate with you off class. It is your responsibility to make sure that your email id is a current one on the blackboard system. I suggest that you use a university email id for this class; it is free and official. I am not responsible for the emails not delivered to your commercially available email accounts.

## **Student Accessibility Support Center Statement**

If you have a physical, psychological, medical, or learning disability that may impact your course work, please contact the Student Accessibility Support Center, Stony Brook Union Suite 107, (631) 632-6748, or at [sasc@stonybrook.edu](mailto:sasc@stonybrook.edu). They will determine with you what accommodations 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 the Student Accessibility Support Center. For procedures and information go to the following website:

<https://ehs.stonybrook.edu//programs/fire-safety/emergency-evacuation/evacuation-guide-disabilities> and search Fire Safety and Evacuation and 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 is 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/commcms/academic\\_integrity/index.html](http://www.stonybrook.edu/commcms/academic_integrity/index.html)

## **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 Student Conduct and Community Standards 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. Further information about most academic matters can be found in the Undergraduate Bulletin, the Undergraduate Class Schedule, and the Faculty-Employee Handbook.