

EED 111: BASIC KINETIC STRUCTURES

Tuesday/Thursday 2:30-5:15

Instructor:

Office Hours:

Course Objective:

The objective of this course is to provide an overview of the many types of kinetic structures currently used in the entertainment industry; the science of these structures; fabrication methods using these structures; and hands-on experience working with these structures. Building on Materials & Fabrication, EED 110, this course will focus on building sophisticated devices incorporating, gears, counter weights, levers, springs, pivots, magnets, pulleys, raceway/gutter/chase, cranks, cams, and axles to create moving devices contained within specific structures. The projects assigned in this course are directly applicable to concepts covered later in statics, dynamics, mechanical engineering, systems of control and electric motor courses.

Course Description:

The goal of the course is for students to develop a competence with motion-creating devices and the effects of these devices on static structures and dynamic objects. Students will build their own projects with special attention to measurement, calibration and the intricacies of assembly, and appearance. The projects will be combined to form a device capable of moving an object through a prescribed path from one end of the class student body to the other. Mechanically engineered, technically directed and kinetically sculpted automata will be arranged so that when activated, a domino effect will ensue. The resulting semi-chain reaction could resemble an exquisite corpse, an anarchist dream, an ant colony, an entropic symphony or a premeditated sequence of events that would of made Rube Goldberg further decompose with delight. Quite simply: you will create something that is greater than the sum of its parts.

Learning Outcomes:

Upon successful completion of this course, the student should be able to:

- identify& describe fundamental prototyping processes such as cutting wood, joining, shaping, gluing, etc
- fabricate simple kinetic components such as gears, pulleys, springs, pendulums, cams and cranks
- build simple kinetic devices using gears, pulleys, springs, pendulums, cams, and cranks
- safely use non-powered hand tools
- safely operate powered hand tools
- safely operate woodworking machinery
- safely operate metal working machinery

- analyze and critique fundamental mechanical entertainment devices and structures
- design, build and evaluate fundamental mechanical entertainment components
- engage in collaboration to create a machine from fabricated components

The class will consist of 6 hours per week of scheduled, supervised studio time in the wood and metal shops. Students may have to work on their projects outside of these scheduled studio sessions. You cannot expect to get a good grade in this class without investing the time.

Materials:

Each student should possess a set of hand tools. The following list is considered a minimum inventory and should be in your possession by the second week of class:

- Safety Glasses
- Gloves
- 16' -25' tape measure
- 12" Combination square
- 16 oz. claw hammer
- Multi-bit screwdriver w/phillips and slotted heads
- 6" needle nose pliers
- 6" diagonal cutters
- 6" slip joint pliers
- 10" groove joint pliers (Channel locks)
- 3/8" drive ratchet and socket set (3/8" -9/16")
- 8" adjustable wrench
- Set of allen wrenches (up to 1/4")
- center punch
- 6" compass
- protractor
- Drill index for high speed steel (1/16" - 3/8" minimum)
- Tool Box or Bag to contain these tools.
- Pen and/or pencil

Grading for the class will be based on:

- 5 Individual Projects
- Projects 1-4 are worth 80% of the total grade
- Project 5 is worth 20%

Each individual project will be graded as follows:

- Working finished device - 60%
- Project notebook - 30%
- Active participation in the project critique - 10%

Specific details on each of the projects will be provided when they are assigned. Upon completion of each of the project, the work will be reviewed in scheduled group critique sessions. All members of the class are expected to take an active role in these sessions; in fact it's a part of your grade.

Each student is expected to maintain a written project notebook. The notebook is to contain notes, drawings, and general thoughts on the design and progress of each project. The notebook is a very important and crucial aid in the design process. The students will not be graded on the quality of content of the notebook, i.e. writing ability, sketching ability, etc., but aesthetics count. This will be discussed. Size and Type: To be provided, at cost. The project notebook (or journal) is subject to periodic review by the instructor and will be graded at the conclusion of each project. **Keep it current!**

Other information:

Things to avoid:

- 1) Not spending enough time outside of class on projects.
- 2) Consistently arriving late or leaving early.
- 3) Turning in projects executed with poor craftsmanship.
- 4) Poor class participation, lack of engagement during the critiques and discussions.
- 5) Time management problems. Not progressing steadily on a project, but rather putting it together at the last minute for the due date.
- 6) Not having a project prepared for preliminary or final critique.
- 7) Turning in projects late or unfinished.
- 8) Missing class. (Missing the safety demonstrations including table saw day seriously jeopardizes the ability to pass the course.)

Neglecting to avoid things in "things to avoid" will result in a significant reduction of your overall grade.

Shop Safety

Throughout the semester you will be introduced to a variety of tools, equipment and techniques. This course involves processes and procedures that are inherently dangerous. Handling this equipment is only dangerous if you do not know what you are doing. Please be mindful at all times when in the vicinity of the machines and people with tools. If nothing else we will be safe throughout the semester. There will be several IMPORTANT demonstrations. STUDENTS MUST ATTEND ALL DEMONSTRATIONS. WATCH AND LISTEN CAREFULLY. If you have any doubts or questions, ask the instructors. Take thorough notes for your own reference. You will be shown how to operate and maintain the equipment. IT IS YOUR RESPONSIBILITY to take care of the tools and report any breakages to the instructors. This is your facility. RESPECT IT and it will serve you well.

- Safety is vital in the workshop!
- Never wear shorts, skirts, open-toed shoes or loose clothing.
- Long hair must be tied back to prevent creating a safety hazard.

- Never run in the shops.
- Safety glasses are to be worn at all times in the shops.
- Always wear the correct safety apparatus. Your work is not as important as your health and wellbeing!
- Report broken or mal-functioning equipment to the instructors. Do not attempt to make repairs on your own!

General Notes

You may only use the shop tools after you have gone through the shop orientation.

It is extremely important that you do research outside the classroom. We can only touch on a limited amount of material. We will be at your disposal to guide you in this outside pursuit.

Library Resources

Students may consult with a librarian on research needs. For this class, the subject librarian is Sue Wainscott. (https://www.library.unlv.edu/contact/librarians_by_subject). UNLV Libraries provides resources to support students' access to information. Discovery, access, and use of information are vital skills for academic work and for successful post-college life. Access library resources and ask questions at <https://www.library.unlv.edu>.

UNLV Policies:

Academic Misconduct—Academic integrity is a legitimate concern for every member of the campus community; all share in upholding the fundamental values of honesty, trust, respect, fairness, responsibility and professionalism. By choosing to join the UNLV community, students accept the expectations of the Student Academic Misconduct Policy and are encouraged when faced with choices to always take the ethical path. Students enrolling in UNLV assume the obligation to conduct themselves in a manner compatible with UNLV's function as an educational institution.

An example of academic misconduct is plagiarism. Plagiarism is using the words or ideas of another, from the Internet or any source, without proper citation of the sources. See the *Student Academic Misconduct Policy* (approved December 9, 2005) located at: <https://www.unlv.edu/studentconduct/student-conduct>.

Copyright—The University requires all members of the University Community to familiarize themselves **with** and to follow copyright and fair use requirements. **You are individually and solely responsible for violations of copyright and fair use laws. The university will neither protect nor defend you nor assume any responsibility for employee or student violations of fair use laws.** Violations of copyright laws could subject you to federal and state civil penalties and criminal liability, as well as disciplinary action under University policies. Additional information can be found at: <http://www.unlv.edu/provost/copyright>.

Disability Resource Center (DRC)—The UNLV Disability Resource Center (SSC-A 143, <http://drc.unlv.edu/>, 702-895-0866) provides resources for students with disabilities. If you feel that you have a disability, please make an appointment with a Disabilities Specialist at the DRC to discuss what options may be available to you. If you are registered with the UNLV Disability Resource Center, bring your Academic Accommodation Plan from the DRC to the instructor during office hours so that you may work together to develop strategies for implementing the accommodations to meet both your needs and the requirements of the course. Any information you provide is private and will be treated as such. To maintain the confidentiality of your request, please do not approach the instructor in front of others to discuss your accommodation needs.

Religious Holidays Policy—Any student missing class quizzes, examinations, or any other class or lab work because of observance of religious holidays shall be given an opportunity during that semester to make up missed work. The make-up will apply to the religious holiday absence only. It shall be the responsibility of the student to notify the instructor within the first 14 calendar days of the course for fall and spring courses (excepting modular courses), or within the first 7 calendar days of the course for summer and modular courses, of his or her intention to participate in religious holidays which do not fall on state holidays or periods of class recess. For additional information, please visit: <http://catalog.unlv.edu/content.php?catoid=6&navoid=531>.

Transparency in Learning and Teaching—The University encourages application of the transparency method of constructing assignments for student success. Please see these two links

for further information:

<https://www.unlv.edu/provost/teachingandlearning>

<https://www.unlv.edu/provost/transparency>

Incomplete Grades—The grade of I—Incomplete—can be granted when a student has satisfactorily completed three-fourths of course work for that semester/session but for reason(s) beyond the student’s control, and acceptable to the instructor, cannot complete the last part of the course, and the instructor believes that the student can finish the course without repeating it. The incomplete work must be made up before the end of the following regular semester for undergraduate courses. Graduate students receiving “I” grades in 500-, 600-, or 700-level courses have up to one calendar year to complete the work, at the discretion of the instructor. If course requirements are not completed within the time indicated, a grade of F will be recorded and the GPA will be adjusted accordingly. Students who are fulfilling an Incomplete do not register for the course but make individual arrangements with the instructor who assigned the I grade.

Tutoring and Coaching—The Academic Success Center (ASC) provides tutoring, academic success coaching and other academic assistance for all UNLV undergraduate students. For information regarding tutoring subjects, tutoring times, and other ASC programs and services, visit <http://www.unlv.edu/asc> or call [702-895-3177](tel:702-895-3177). The ASC building is located across from the Student Services Complex (SSC). Academic success coaching is located on the second floor of the SSC (ASC Coaching Spot). Drop-in tutoring is located on the second floor of the Lied Library and College of Engineering TEB second floor.

UNLV Writing Center—One-on-one or small group assistance with writing is available free of charge to UNLV students at the Writing Center, located in CDC-3-301. Although walk-in consultations are sometimes available, students with appointments will receive priority assistance. Appointments may be made in person or by calling 702-895-3908. The student’s Rebel ID Card, a copy of the assignment (if possible), and two copies of any writing to be reviewed are requested for the consultation. More information can be found at: <http://writingcenter.unlv.edu/>.

Rebelmail—By policy, faculty and staff should e-mail students’ Rebelmail accounts only. Rebelmail is UNLV’s official e-mail system for students. It is one of the primary ways students receive official university communication such as information about deadlines, major campus events, and announcements. All UNLV students receive a Rebelmail account after they have been admitted to the university. Students’ e-mail prefixes are listed on class rosters. The suffix is always @unlv.nevada.edu. **Emailing within WebCampus is acceptable.**

Final Examinations—The University requires that final exams given at the end of a course occur at the time and on the day specified in the final exam schedule. See the schedule at: <http://www.unlv.edu/registrar/calendars>.