2021-2022

Course Selection Guide

For Mechanical Engineering Majors

UCONN

University of Connecticut
Department of Mechanical Engineering
School of Engineering

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Introduction

The School of Engineering

The Bachelor of Science in Engineering (BSE) curriculum is designed to give sound knowledge of basic principles in mathematics, physics, and chemistry; to provide education in the theory, principles, and practices of engineering; and to present the opportunity to obtain additional instruction and experience in one of the major engineering disciplines. Students gain hands-on experience in the laboratory courses that accompany classroom work, and develop design skills in course work beginning in the first two years. Design experience continues in junior and senior years in both the thermal-fluids and mechanical systems stems of the program, culminating in the two semester Senior Design Project courses.

What is a Mechanical Engineer?

Mechanical engineers use skills in mathematics and science to develop, design, and manufacture tools, engines, machines, and many other mechanical devices that improve our standard of living. Mechanical engineering is one of the most diverse disciplines within the engineering profession; mechanical engineers collaborate with doctors to design better medical equipment, research and build renewable energy technologies, and create robots that replicate human movement. Mechanical engineers design things we use everyday, and lead innovation in state-of-the-art technologies like nanotechnology, an emerging field in which functional systems are engineered at the molecular level.

Using this Guide

This Course Selection Guide will assist you in completing your educational goals at the University in the Mechanical Engineering Program, in conjunction with your faculty advisor and the University of Connecticut General Catalog. The Catalog current at the time of the student's admission or readmission to the School, whichever is later, lists the requirements for that student’s graduation.

Accreditation of the Mechanical Engineering Program

The Mechanical Engineering Program at the University of Connecticut is accredited by the Engineering Accreditation Commission of ABET, http://www.abet.org. The University of Connecticut Mechanical Engineering Program faculty strives to continuously improve the undergraduate program in Mechanical Engineering. The program's educational objectives are:

1. Our graduates will be gainfully employed in mechanical engineering or related career paths including industrial, academic, governmental and non-governmental organizations.

2. Our graduates will continue their professional development by engaging in professional activities and/or training to enhance their careers and/or pursue post-graduate studies.

The Mechanical Engineering program is accredited by ABET, which requires that each student follow a curriculum that has the following minimum content:

- One year of an appropriate combination of mathematics and basic science (**32 credits**)
- One and one-half years of an appropriate combination of engineering science and design (**48 credits**)
- Humanities and social science consistent with the program and University objectives **(18 credits)**.

The Mechanical Engineering program detailed in the Plan of Study meets these requirements.

General Education Requirements

The University requires all baccalaureate degree students to satisfy a common core of course work known as the General Education Requirements. Coursework in the Arts, Humanities and Social Sciences is also an integral part of the engineering program. Courses must be taken and distributed to cover the Four Content Areas and the Five Competencies listed below. Please see the University of Connecticut General Catalog for more detailed information. Note that students must earn at least a 2.0 grade point average for all calculable course work to receive a degree.

The Four Content Areas

The courses taken to satisfy the General Education Content Areas One, Two, and Three must be selected from six different departments.

1. Arts and Humanities

Two courses from two different departments in this content area are required. These courses emphasize artistic, cultural, and historical topics. **(PHIL 1104, required of all engineering students, meets a Content Area One course requirement.)**

2. Social Sciences

Two courses from two different departments in this content area are required. These courses emphasize the ways in which people and institutions interact.

3. Science and Technology

Two courses from two different departments in this content area are required. These courses provide background in the sciences, including laboratory work. **(CHEM 1127 and PHYS 1501Q, required of all engineering students, meet the Content Area Three requirement.)**

4. Diversity and Multiculturalism

Two courses in this content area are required. These courses provide background on the global community and other cultures with which engineers will interact over the course of their careers. At least one of these courses must be classified as international. One course (only) may be used to meet both this requirement and a course requirement in Content Areas One or Two.

The Competencies

1. Second Language Competency

The minimum requirement is met by three years of a single foreign language in high school or equivalent, or completion of a two-semester course sequence in any foreign language at the University.

2. Writing (W) Competency

All students must take either ENGL 1010 or ENGL 1011. Students taking ENGL 2100 in the Honors Program and transfer students with both ENGL 91002 and 91003 also satisfy. In addition, Mechanical Engineering students must complete two required writing (W) courses: ME 4973W and one additional course.

3. Quantitative (Q) Competency

All students must take **two Quantitative (Q) courses**. The mathematics course requirements for the Mechanical Engineering major meet this requirement.

4. Computer Technology Competency

By graduation, ME students are expected to understand computer logic and basic structure and to have the ability to develop algorithms. These competencies are achieved by completing CSE 1010— Introduction to Computing, or equivalent course.

5. Information Literacy Competency

In addition to the basic competency achieved in ENGL 1010/1011 or equivalent, all Engineering students will receive instructions in ENGR 1000 or equivalent on how to conduct effective information searches, both in the library and on the web. As the student progresses, successive courses will require an increased level of Information Literacy competency. An advanced level of Information Literacy will be achieved at the completion of the program's major design experience course.

6. Environmental Literacy Competency

All students entering on Catalog Year 2019-2020 and later will be required to take one course with an E designation.

School of Engineering and Mechanical Engineering Requirements

School of Engineering Requirements

Course	Title	Credits
CHEM 1127Q	Chemistry I (contributes to Content Area Three requirement)	4
CSE 1010	Introduction to Computing (fulfills Computer Tech. Competency requirement)	3
ENGR 1000	Orientation to Engineering	1
ENGR 1166	Foundations of Engineering	3
Math 1131Q	Calculus I (contributes to Quantitative Competency Requirement)	4
MATH 1132Q	Calculus II (contributes to Quantitative Competency Requirement)	4
MATH 2110Q	Multivariable Calculus	3
MATH 2410Q	Elementary Differential Equations	3
PHIL 1104	Ethics (contributes to Content Area One Requirement)	3
PHYS 1501Q	Physics for Engineers I (contributes to Content Area Three requirement)	4
PHYS 1502Q	Physics for Engineers II (contributes to Content Area Three requirement)	4

Mechanical Engineering Requirements

Course	Title	Credits	Course	Title	Credits
CE 2110	Applied Mechanics I	3	ME 3242	Heat Transfer	3
CE 2120	Applied Mechanics II	3	ME 3250	Fluid Dynamics I	3
CE 3110	Mechanics of Materials	3	ME 3253	Linear Systems Theory	3
ECE 2000	Electrical and Computer Engineering Principles	3	ME 3255	Computational Mechanics	3
ME 2233	Thermodynamic Principles	3	ME 3263	Intro to Sensors and Data	3
ME 2234	Applied Thermodynamics	3	ME 3264	Applied Measurements Lab	3
ME 3220	Mechanical Vibrations	3	ME 4972	Senior Design Project I	3
ME 3227	Design of Machine Elements	3	ME 4973W	Senior Design Project II	3

Mechanical Engineering Major Electives

It is recommended that students think about their electives as a whole, and consider using them deliberately to either gain breadth in their educational program or to focus on an area of particular interest (see "Areas of Concentration," page 8). Students should consult their faculty advisor to plan a course of study which will best meet their individual educational goals.

The Mechanical Engineering Requirement

9 credits in 2000 level or higher Mechanical Engineering courses which are not used to satisfy any other requirement. No more than one ME 3299 course may be used toward meeting this requirement. This course work may also be applied toward a minor.

The Professional Requirement

6 credits in 2000 level or higher courses in any Engineering department or in Mathematics, Statistics, Physical and Life Sciences as listed in the *University of Connecticut Catalog*. This course work may also be applied toward a minor. *(Note 1 Credit ENGR 3195 courses do NOT count towards the Professional Requirement.)*

The Mathematics and Science Requirement

6 credits in 1000 level or higher courses in Mathematics, Statistics, Physical and Life Sciences as listed in the University of Connecticut Catalog. **Courses at the 2000 level or higher can also be used to meet the Professional Requirement.** Restrictions on courses are noted as the following:

- All Mathematics courses 2000-level or higher may be used to meet this requirement except MATH 2720W and 2794W;
- All Statistics courses may be used to meet this requirement except STAT 1000Q;
- All Biology and Biological Sciences courses may be used to meet this requirement (BIOL, EEB, MCB, PNB);
- All Chemistry courses except CHEM 1101 may be used to meet this requirement;
- All Geology and Geophysics courses may be used to meet this requirement;
- All Marine Science courses may be used to meet this requirement.

Free Electives

- 6 credits of any University courses. If the General Education requirements are met by seven courses, an additional 3 credits of an elective course are required. Elective course work may also be applied toward a minor.

Mechanical Engineering Areas of Concentration

The ME Department offers Areas of Concentration (AoC) for students wishing to focus their required electives into one of four content areas: Aerospace, Dynamic Systems and Control, Energy and Power, or Design and Manufacturing. The courses that contribute to each AoC are listed below. If you take three courses in one AoC and earn a minimum of "C" in each, you can apply to have this Concentration listed on your transcript by completing the Area of Concentration form.

Additional Information:

1. Please only complete the online form after you have registered for the last class needed to complete the concentration. The form should not be submitted based on future planned courses and will be returned to you if all courses are not completed or scheduled.
2. If you are interested in earning a second Concentration, only one course may be used twice. That is, the second concentration requires at least two courses beyond those used to satisfy the first.
3. If you would like to plan your future electives so that you may earn a Concentration, please review the ME Department's current planned schedule of electives. This list is our current estimate of future offerings and is not a guarantee that these courses will run as listed. Elective course lists will be updated each semester to reflect the most recent projected course schedule.

Aerospace Concentration

ME3239 – Combustion for Energy Conversion
ME3251 – Fluid Dynamics II
ME3275 – Introduction to Computational Fluid Dynamics
ME3276 – Propulsion
ME3280 – Turbines and Centrifugal Machinery
ME3295 – Special Topics: Acoustics
ME3295 – Special Topics: Aerodynamics & Flight Mechanics
ME3295 – Special Topics: Aerospace Control Systems
ME3295 – Special Topics: Analysis of Composite Materials and Structures
ME3295 – Special Topics: Introduction to the Finite Element Method
ME3295 – Special Topics: Mechanics of Composite Materials
ME3295 – Special Topics: Structural Dynamics
ME5311 – Computational Methods of Viscous Fluid Flow
ME6160 – Turbines and Centrifugal Machinery

Dynamic Systems & Control Concentration

ME3214 – Dynamics of Particles and Rigid Bodies
ME3295 – Special Topics: Aerospace Control Systems
ME3295 – Special Topics: Acoustics
ME3295 – Special Topics: Advanced Vibrations
ME3295 – Special Topics: Modeling and Simulation for Materials and Biology
ME3295 – Special Topics: Structural Dynamics
ME5160 – Theory and Design of Automatic Control Systems
ME5180 – Dynamics
ME5210 – Intelligent Material Systems and Structures
ME5420 – Mechanical Vibrations I
ME5895 – Special Topics: Mechatronics
ME6330 – Advanced Measurement Techniques

Energy and Power Concentration

ME3239 – Combustion for Energy Conversion
ME3251 – Fluid Dynamics II
ME3270 – Fuel Cells
ME3275 – Introduction to Computational Fluid Dynamics
ME3276 – Propulsion
ME3280 – Turbines and Centrifugal Machinery
ME3285 – Sustainable Energy Sources & Systems
ME5311 – Computational Methods of Viscous Fluid Flow
ME6160 – Turbines and Centrifugal Machinery

Design and Manufacturing Concentration

ME3217 – Metal Cutting Principles
ME3221 – Manufacturing Automation
ME3222 – Production Engineering
ME3224 – Analysis and Design of Mechanisms
ME3225 – Computer Aided Design, Modeling & Graphics
ME3228 – Introduction to Fatigue in Mechanical Design
ME3295 – Special Topics: Advanced Biomechanics of Soft Tissues
ME3295 – Special Topics: Analysis of Composite Materials and Structures
ME3295 – Special Topics: Computers in Manufacturing
ME3295 – Special Topics: Geometric Modeling
ME3295 – Special Topics: Introduction to Products and Processes
ME3295 – Special Topics: Introduction to the Finite Element Method
ME3295 – Special Topics: Mechanics of Composite Materials
ME3295 – Special Topics: Principles of Optimum Design
ME3295 – Special Topics: Six Sigma Green Belt Using Minitab
ME5150 – Analytical and Applied Kinematics
ME5155 – Geometric Modeling
ME5210 – Intelligent Material Systems and Structures
ME5220 – Principles of Machining and Machine Tools
ME5511 – Principles of Optimum Design
ME5895 – Special Topics: Probabilistic Engineering Design

Mechanical Engineering Curriculum

Freshman Fall

Course	Title	Credits
ENGL 1010/1011	Composition	4
MATH 1131Q	Calculus I	4
CHEM 1127Q	Chemistry I	4
ENGR 1000	Orient. to Engineering	1
CSE 1010	Intro. to Computing	3
Total Credits		**16**

Freshman Spring

Course	Title	Credits
MATH 1132Q	Calculus II	4
ENGR 1166	Found. of Engineering	3
PHYS 1501Q	Physics for Engr. I	4
GEN ED	Content Area Course	3
GEN ED	Content Area Course	3
Total Credits		**17**

Sophomore Fall

Course	Title	Credits
CE 2110	Applied Mechanics I	3
MATH2110Q	Multivariable Calculus	4
ME 2233	Thermodynamic Principles	3
PHYS 1502Q	Physics for Engr. II	4
GEN ED	Content Area Course	3
Total Credits		**17**

Sophomore Spring

Course	Title	Credits
CE 2120	Applied Mechanics II	3
MATH2410Q	Differential Equations	3
ME 2234	Applied Thermodynamics	3
PHIL 1104	Ethics	3
GEN ED	Content Area Course	3
GEN ED	Content Area Course	3
Total Credits		**18**

Junior Fall

Course	Title	Credits
CE 3110	Mechanics of Materials	3
ME 3xxx	ME Elective	3
ME 3250	Fluid Dynamics I	3
ME 3253	Linear Systems Theory	3
ME 3263	Intro. to Sensors & Data	3
Total Credits		**15**

Junior Spring

Course	Title	Credits
ME 3220	Mechanical Vibrations	3
ME 3242	Heat Transfer	3
ME 3264	App. Measurements Lab	3
MSE 2101	Materials Science & Eng.	3
YYY xxxx	Prof. Requirement	3
Total Credits		**15**

Senior Fall

Course	Title	Credits
ME 3227	Design of Machine Elem.	3
ME 3255	Comput. Mechanics	3
ME 4972	Senior Design Project I	3
ME 3xxx	ME Elective	3
ECE 2000	Elec. & Comp. Principles	3
Total Credits		**15**

Senior Spring

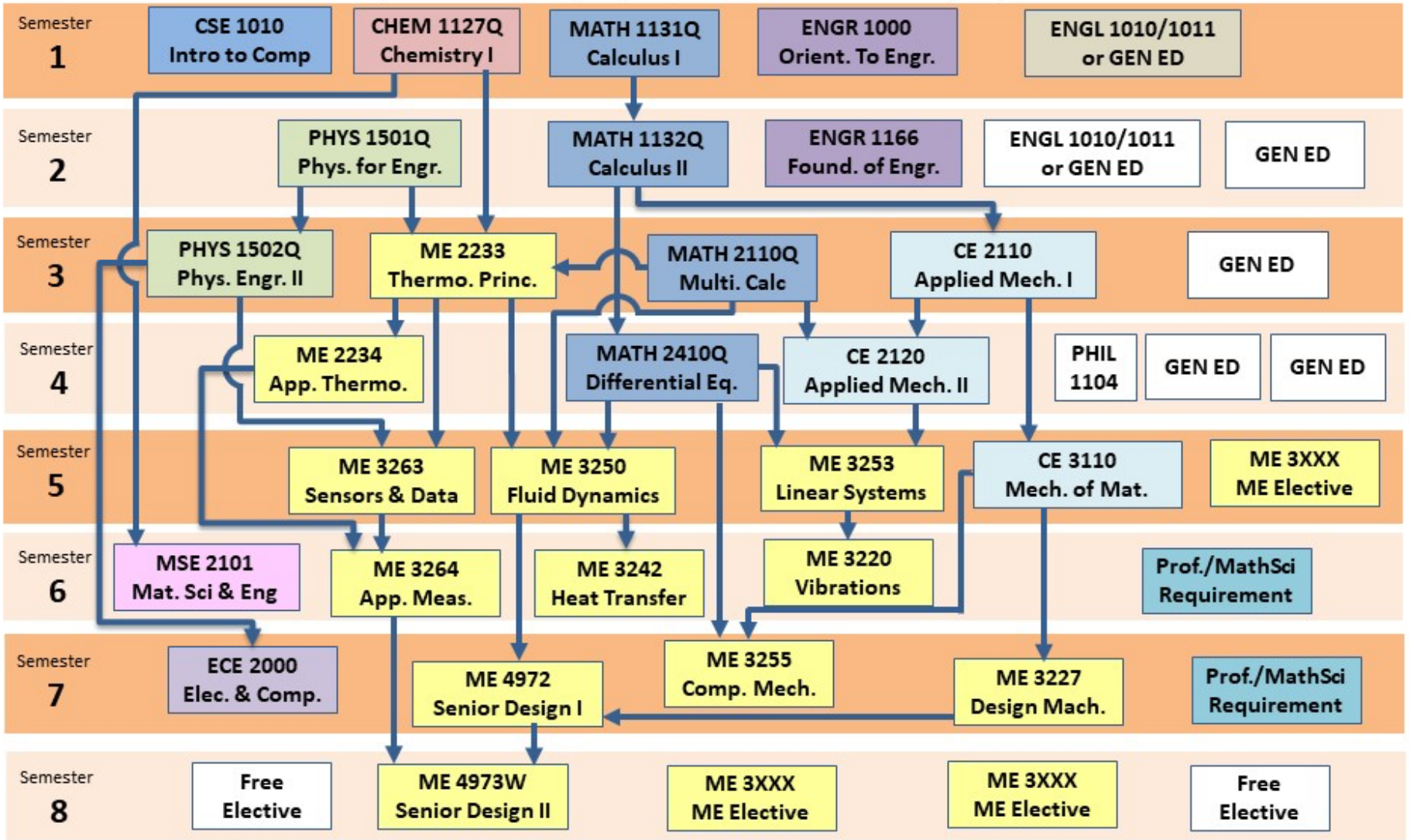
Course	Title	Credits
ME 4973W	Senior Design Project II	3
ME 3xxx	ME Elective	3
YY xxxx	Prof. Requirement	3
	Free Elective	3
	Free Elective	3
Total Credits		**15**

Total Credits: 128

Mechanical Engineering Curriculum Map

Updated 8/1/2018

(down arrows indicate pre-requisite, horizontal arrows indicate co-requisite)



Professional Requirement

Two courses at the 2000 level or higher in engineering, mathematics, statistics, physical, or life sciences

Additional Math and Science Requirement

6 credits in 1000 level or higher mathematics, statistics, physics, or life sciences. For a complete list of courses that satisfy this requirement, see your advisement report.

Note: 2000 level or higher mathematics, statistics, physics, or life sciences courses may be used to satisfy both requirements.

You must meet with your academic advisor at least once every semester to ensure you are making satisfactory progress towards your degree.

Plan of Study

What is the Plan of Study?

The Plan of Study (POS) is a contract between you and the University. Using the "Academic Planner" and the "Academic Requirements" modules in Student Administration, the POS lists all of the courses you will take to meet the requirements for your degree. Once you have passed all of these courses, you will receive your degree.

A **preliminary POS** is filed prior to your final year of coursework and outlines your plan for the remainder of your coursework until graduation. A **final POS** is filed after you have registered for your final semester of coursework. The final POS must demonstrate that the student meets all requirements to graduate. This video tutorial explains how to prepare and submit your POS: https://www.youtube.com/watch?v=bXChknVu1yM

Where can I access the POS?

You can begin working on your POS by accessing the "Academic Planner" component in Student Administration (www.studentadmin.uconn.edu). Then you can select "Plan by Requirements" to review your remaining unsatisfied requirements for your degree. Once you understand which courses you still need to take, review what semester those courses are offered and enter them into your Academic Planner accordingly. When you have completed this, you can select "Submit Plan of Study" and the document will be sent electronically to your advisor and department for their review.

When should I submit my preliminary and final POS?

The preliminary POS (PPOS) can be submitted any time after earning 54 credits, which is typically during a student's fourth or fifth semester. You will have a registration hold on your account until your PPOS is approved.

Your final POS must be submitted as soon as possible after registering for your final semester of coursework.

Advising

Each student will be assigned to a departmental advisor who will assist them with their curricular plan. Freshmen and sophomore students will be assigned to Ashley Rose McLaury, professional staff advisor. Juniors and seniors will have a faculty advisor. The Faculty Advising Principles are included below for your reference.

Advising Principles for ME Faculty

The Mechanical Engineering Department holds that academic advising of undergraduates is a professional responsibility of the faculty. This advising will help our students to develop their undergraduate program from the freshman year onward to educate them to enter the profession or to continue their formal education beyond the first degree.

The following principles guide our actions:

1. Faculty will treat undergraduates as individuals who deserve our full attention when advising them.

2. Faculty will meet with students at least twice a year to discuss course selection for the coming semester and beyond. Except when the student is not currently resident at the University, these meetings are to be face-to-face.

3. At the meetings noted in item #2, the faculty advisor will lift the registration bar of the student after class plan for the next semester is selected. Note that a student may have other bars in place; the faculty member can alert the student to these.

4. During the first semester of the junior year, the faculty member should have the student complete the Plan of Study.

5. In advising students, faculty should point out difficulties in meeting prerequisites of other courses when a student seeks to drop a course. This also means pointing out that many required courses only meet once a year.

6. Advisors will be able to assist students with academic problems when needed.

7. Advisors will assist students by explaining consequences of significant deviations from normal course sequences.

8. Advisors will provide guidance and counsel for students considering leaving engineering.

9. Advisor will be available to discuss personal problems that students may have and guide them to University help for them.

The Advising Committee
Bryan Weber (Chair), Chengyu Cao, Baki Cetegen, Wilson Chiu, Tai-Hsi Fan, Horea Ilies, Jason Lee, Tianfeng Lu, George Lykotrafitis, Vito Moreno, Nejat Olgac, Ugur Pasaogullari, Reza Sheikhi, Chih-Jen Sung