



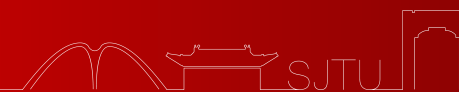
上海交通大學  
SHANGHAI JIAO TONG UNIVERSITY



JOINT INSTITUTE  
交大密西根学院

# WAY FORWARD 2024

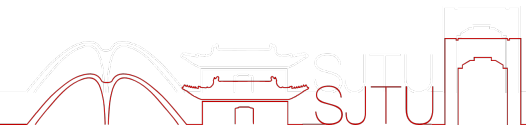
KANTAPHAT LEELAKUNWET



- University of Michigan - Shanghai Jiao Tong University Joint Institute (UM-SJTU JI)
- Electrical and Computer Engineering
- First Class Scholarship (Shanghai Government Scholarship)



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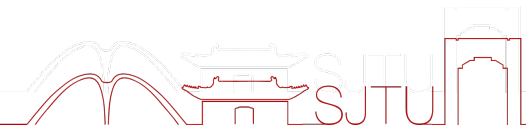
## Engineering Cluster Program (English) - 2006



University of Michigan - Ann Arbor  
Rank 44



Shanghai Jiao Tong University  
Rank 45



# Tuition Fee



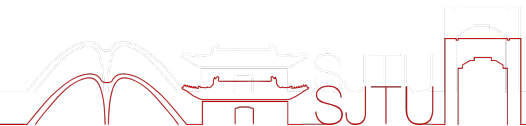
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RMB 80,000 → THB 400,000

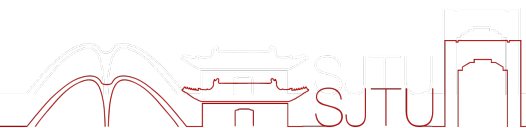


USD 60,000 → THB 2,200,000 !!!



## Bachelor of Science in Engineering

- Electrical and Computer Engineering
- Mechanical Engineering
- Materials Science and Engineering

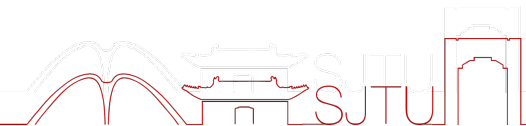


## 3 Semesters

- Fall (September - December)
- Spring (February - April) (Mandatory for Freshmen)
- Summer (May - August)

## Exchange Program

- Cornell University, US (Rank 16)
- Carnegie Mellon University, US (Rank 58)
- TU Delft, Netherland (Rank 49)
- KTH Royal Institute of Technology, Sweden (Rank 74)

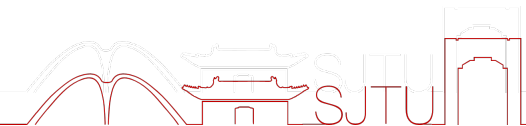


## Program

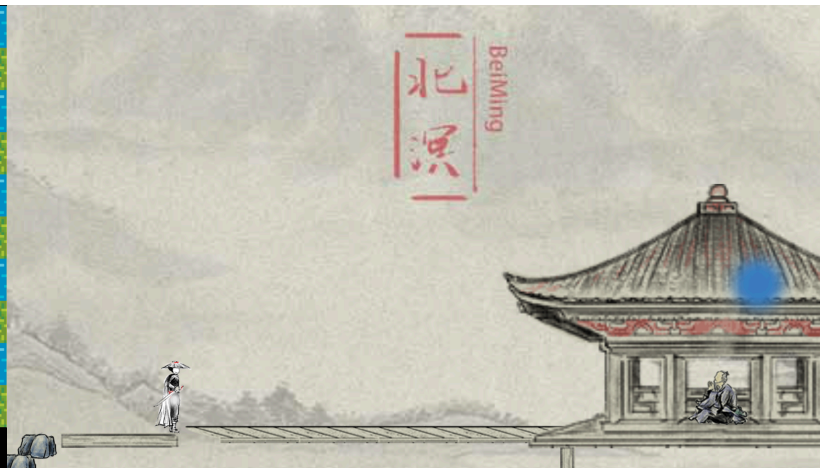
- JI Degree (4Y China)
- Dual Degree (2Y China + 2Y U.S.)
- Global Degree Pathway (4Y China + 1Y Abroad, Bachelor + **Master**)

## Minor

- Data Science
- Computer Science
- Entrepreneurship
- Global China Studies
- Industrial AI
- ECE



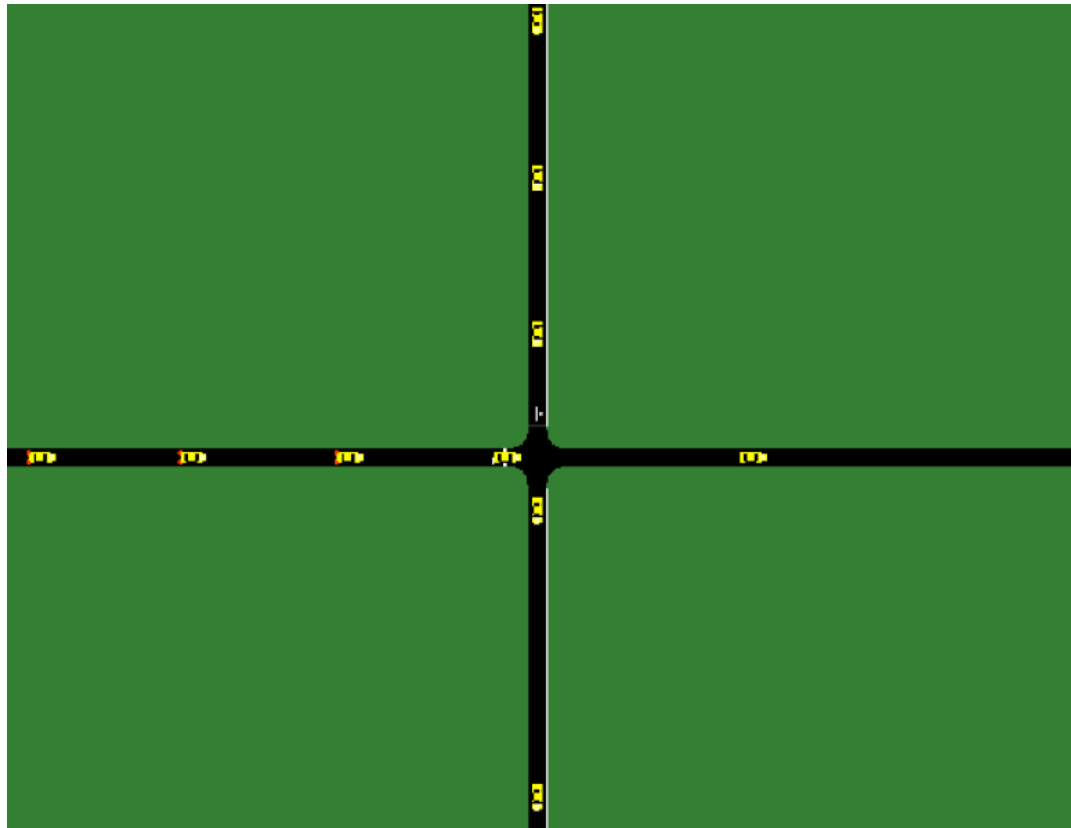
## VG100 Introduction to Engineering - Game Development





## VE490 Undergraduate Research

# Robust Control Framework for Ensuring Safety in Disconnected Cooperative Adaptive Cruise Control at Signal-Free Intersection



```

if traci.vehicle.getLaneID(id) not in ["w_0", "n_0"] and
leave[id] = traci.simulation.getTime()
departure[id] += str(leave[id])

leader = traci.vehicle.getLeader(id)

# if traci.simulation.getTime() > 30 and id == "10" and traci
if connection[id] == 0:
    # Reconnect
    if random.uniform(0, 1) < const.reconnect_rate:
        if leader != None and connection[leader[0]] in [0,
            connection[id] = 1
        else:
            connection[id] = 2
    else:
        if random.uniform(0, 1) < const.packet_loss_rate:
            connection[id] = 0
        elif connection[id] == 1:
            if leader != None and connection[leader[0]] == 2:
                connection[id] = 2
        elif connection[id] == 2:
            if leader != None and connection[leader[0]] in [0,
                connection[id] = 1

if connection[id] in [0, 1]:
    safetyDistance = const.dACC
else:
    safetyDistance = const.dCACC

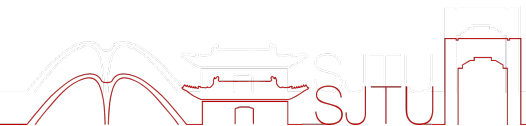
prev = ID[ID.index(id) - 1]
    
```

$$u_i^{[t+1]} = u_i^{[t]} - \bar{v}[t], \quad (1)$$
 Theorem 1: If  $r = -\frac{1}{\Delta t^2}$  and  $s \in [-\Delta t^2 \varepsilon, \Delta t^2 \varepsilon]$  and  $v_i[t] - \bar{v} \in [-\bar{d} + \beta \bar{v}, \bar{d} + \beta \bar{v}]$ ,
 Now that  $\bar{d} + \beta \bar{v}$  is a constant, the absolute safety distance. To meet the safety constraint at all times (time step  $t = 0$  and 1) and crossroad delay  $t_d$  between the vehicles and intersection capacity will be maximized. Now, instead of assigning  $\hat{T}$  as the vehicle order of the vehicle, backtrack the target position from step by
 
$$\bar{x}_0[t+1] = \bar{x}_0$$
 for the first vehicle, and
 
$$\bar{x}_{N(i)}[t] = \min\{\bar{v}(t\Delta t - \dots$$
 for the rest.
 D. Restriction & Disconnection
 There are several external factors of converging to the target quantity. For example:
 

- the controlled acceleration interval  $[u_{min}, u_{max}]$  considered
- the speed is bounded to  $[0, v_{max}]$
- the packet loss of CACC vehicle will not be able to follow the preceding car simultaneously, that is following an ACC vehicle.

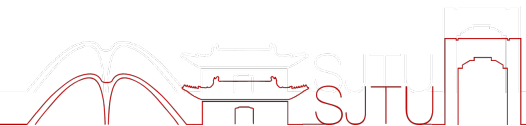
## Engineering Foundation (39 credits)

- Calculus II - MATH1160J or Honors Calculus II - MATH1560J or Honors Mathematics II - MATH1860J
- Calculus III - MATH2150J or Honors Calculus III - MATH2550J or Honors Mathematics III - MATH2850J
- Calculus IV - MATH2160J or Honors Calculus IV - MATH2560J or Honors Mathematics IV - MATH2860J
- Discrete Mathematics - MATH2030J
- Chemistry - CHEM2090J or CHEM2100J
- Chemistry Lab - CHEM2110J
- General Physics PHYS1401J and PHYS2401J, Physics PHYS1500J and PHYS2500J or honors sequence PHYS1600J and PHYS2600J
- Physics Lab I & II - PHYS1410J & PHYS2410J
- Introduction to Engineering - ENGR1000J
- Introduction to Computer and Programming - ENGR1010J



## Program Subject (39 credits)

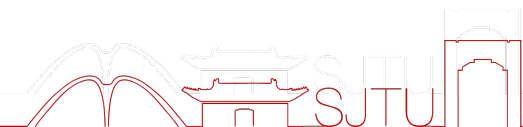
- Introduction to Circuits - ECE2150J
- Introduction to Signals and Systems - ECE2160J
- Programming & Introductory Data Structures - ECE2800J
- Electromagnetics I - ECE2300J
- Introduction to Logic Design - ECE2700J
- Electronic Circuits - ECE3110J
- Introduction to Computer Organization - ECE3700J
- Probabilistic Methods in Engineering - ECE4010J
- Technical Communication - TC3000J
- Advanced Technical Communication - TC4960J
- Capstone Design - ECE4500J or Global MDP - ENGR4500J  
or a Major Design Experience (MDE) course



Discipline Areas	Required Courses	Elective Options
<b>Circuits and Devices</b>	ECE2150J Intro to Circuits ECE3110J Electronic Circuits	ECE3120J Digital IC Design ECE3200J Intro to Semicon. Devices ECE4110J Microwave Circuits I ECE4130J Monolithic Amplifier Circuits ECE4140J Introduction to MEMS ECE4210J Properties of Transistors ECE4270J VLSI Design
<b>Electromagnetics, Optics, and Photonics</b>	ECE2150J Intro to Circuits ECE2300J Electromagnetics I	ECE3200J Intro to Semicon. Devices ECE3300J Electromagnetic II ECE3340J Principles of Optics ECE4340J Principles of Photonics ECE4380J Adv. Lasers and Optics Lab
<b>Communications, Signal Processing, and Control</b>	ECE2150J Intro to Circuits ECE2160J Signals and Systems ECE4010J Probabilistic Methods in Engr.	VE353 Intro to Comm. Systems ECE4510J Digital Signal Processing ECE4550J Digital Comm. Sig. and Sys. ECE4600J Contr. Sys. Analysis and Dsn. ECE4890J Computer Networks ECE6601J Probability and Random Processes
<b>Computer Science and Engineering</b>	ECE2700J Intro to Logic Design ECE2800J Progra. And Data Structures ECE3700J Intro to Comp. Organization	ECE2810J Data Structure and Algorithms ECE3730J Microprocessor Based Sys. Dsn ECE4410J App Development for Entrepreneurs ECE4440J Networks ECE4450J Intro to Machine Learning ECE4700J Computer Architecture ECE4730J Advanced Embedded System ECE4750J Intro to Cryptography ECE4770J Intro to Algorithms ECE4820J Intro to Operating Sys. ECE4850J Optimization in Machine Learning ECE4870J Interactive Computer Graphics ECE4890J Computer Networks ECE4920J Intro to Artificial Intelligence

## Program Subjects (50 credits)

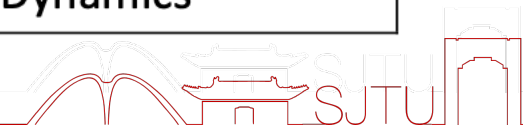
- Introduction to Circuits - ECE2150J
- Machinshop Training - ME0800J or ME0801J
- Introduction to Solid Mechanics -ME2110J
- Thermodynamics - ME2350J
- Introduction to Dynamics and Vibrations - ME2400J
- Design and Manufacturing I - ME2500J
- Fluid Mechanics I – ME3200J
- Heat Transfer – ME3350J
- Design and Manufacturing II – ME3500J
- Modeling, Analysis and Control of Dynamic Systems – ME3600J
- Mechanical Behavior of Materials – ME3820J
- Laboratory I – ME3950J
- Design and Manufacturing III – ME4500J or Global MDP – ENGR4500J
- Laboratory II – ME4950J



# Mechanical Engineering (ME)

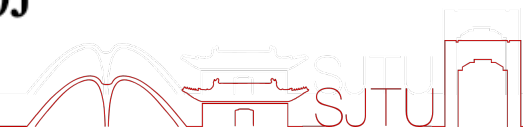


Discipline Areas	Required Courses	Elective Options
<b>Design, Manufacturing, and Systems</b>	ME2400J Intro to Dynamics and Vibrations ME2500J Design & Manufacturing I ME3500J Design & Manufacturing II ME3600J Modeling, Analysis and Control of Dynamic Systems ME4500J Design & Manufacturing III	ME4550J Intro. to Data Driven Eng. Design ME4610J Automatic Control ME4670J Introduction to Robotics ME4820J Machining Processes ME6601J Mechatronic Systems Design ECE6602J Linear Systems ME6801J Manufacturing Processes and Systems
<b>Solid Mechanics</b>	ME2110J Intro to Solid Mechanics ME3820J Mechanical Behavior of Materials	ME3110J Strength of Materials ME4050J Finite Elements in Mechanical Eng. ME6101J Continuum Mechanics
<b>Thermal and Fluids</b>	ME2350J Thermodynamics I ME3200J Fluid Mechanics ME3350J Heat Transfer	ME4210J Thermal-Fluids Systems Design ME4320J Combustion ME4330J Advanced Energy Solutions ME4340J Materials for Energy Conversion ME4580J Automotive Engineering ME6202J Computational Fluid Dynamics

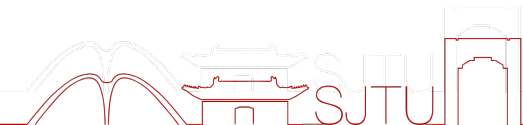


## Program Subject (41 credits)

- Introduction to Solid Mechanics - ME2110J
- Principles of Engineering Materials - MSE2500J
- Physics of Materials - MSE2420J
- Thermodynamics of Materials - MSE3300J
- Kinetics and Transport in Material Engineering - MSE3350J
- Structure of Materials - MSE3500J
- Mechanical Behavior of Materials - ME3820J
- Materials Lab I - MSE3600J
- Materials Lab II - MSE3650J
- Product Design and Manufacturing – MSE4500J
- Designing Sustainable Product and Processes - MSE4810J



ME4340J	Materials for Energy Conversion
MSE4120J	Polymeric Materials
MSE4930J	Self-assembly of Materials and Devices
MSE6201J	Electrical, Optical and Magnetic Properties of Materials
MSE6202J	Structural, Physical and Chemical Characterization of Materials
MSE6204J	Statistical Physics
MSE6601J	Introduction to Soft Matter Physics
MSE6602J	Battery Materials: Fundamentals and Applications





## Academic Writing (8 credits)

- Academic Writing I – ENGL1000J
- Academic Writing II – ENGL2000J

## Intellectual Breadth (16 credits)

This category requires:

- 2 credits of ENGR4960J Professional Ethics, and
- 14 credits of courses in humanities, social sciences, professional development, natural sciences, and art.
- At least 3 credits in humanities and at least 3 credits in social sciences must be completed.
- Up to 8 credits of language courses can be counted towards this category.

Humanities category includes, but not limited to, Philosophy, English Language and Literature, Asian Languages and Culture, American Culture, Comparative Literature, Film Studies, etc.

Social Sciences category includes, but not limited to, International and Comparative Studies, Political Science, Asian Studies, Economics, Environmental Studies, History, etc.

Professional Development category includes, but not limited to, Engineering Ethics, Business Studies, Entrepreneurship Studies, etc.

Natural Sciences category includes Biology, Chemistry, Physics, Astronomy, and Earth Sciences.



## First-Class

- Full tuition award
- Living allowance (2,500 CNY per month)
- Accommodation subsidy (1,000 CNY per month)

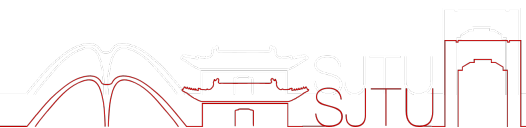
## Second-Class

- 50% tuition award
- Accommodation subsidy (1,000 CNY per month)

## Third-Class

- 25% tuition award

**4 Years with Insurance**



- SAT, ACT, A-Level, IB  
(Others need to contact the recruitment office)
- IELTS  $\geq$  6.0 or TOEFL  $\geq$  84
- Two recommendation letters
  - ✓ high school counselor
  - ✓ core academic teacher
- High School Transcript
- Application Fee of 75 USD
- Other documents

# Thank you



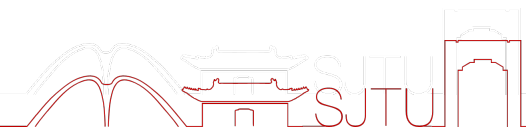
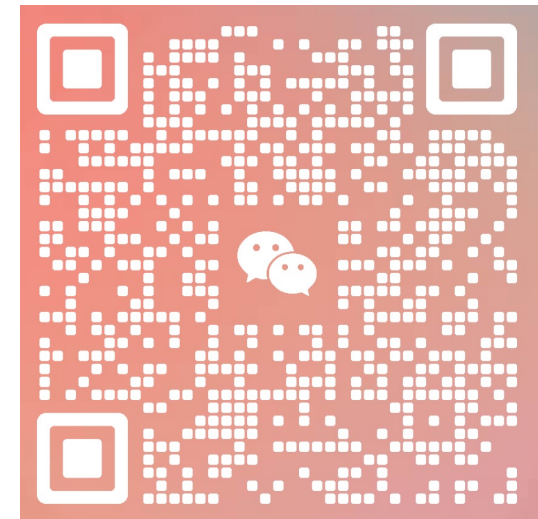
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kantaphat.lee@sjtu.edu.cn



kantaphatjinyuan



## UM-SJTU Main Website

<https://www.ji.sjtu.edu.cn>

## Dual Degree & Global Degree Pathway Program

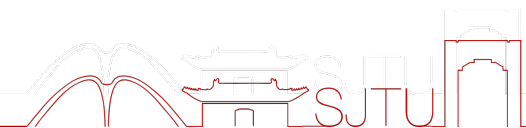
<https://www.ji.sjtu.edu.cn/academics/ipo/study-abroad/degree-programs/>

## Exchange Program

<https://www.ji.sjtu.edu.cn/academics/ipo/study-abroad/non-degree-programs/>

## Student Handbook (Details)

<https://www.ji.sjtu.edu.cn/faculty-staff/download-center/student-handbook/>



## Application Requirements

<https://www.ji.sjtu.edu.cn/admission/international-undergraduate-admission/application-requirements/>

## Fees & Scholarships

<https://www.ji.sjtu.edu.cn/admission/international-undergraduate-admission/fees-and-scholarships/>

