

Engineering Summer Program at Rutgers

Program Introduction

This Student Program in Engineering is a two-week (extendable to 3 weeks) summer session for undergraduates from other universities beyond the US. Students from STEM backgrounds attend frontier lectures held by outstanding faculty in School of Engineering at Rutgers and participate in laboratory workshops with hands on implementing projects. At the closing ceremony, students demonstrate what they've learned during a presentation session. To immerse students into campus life at Rutgers, students will have the opportunity to engage with Rutgers students during their stay at our university. Students will improve their comprehensive English abilities by attending intensive English for academic purpose classes. Participating students will also learn about American popular culture and history through culture activities, as well as local excursions and excursions to New York, Philadelphia, and Boston or Washington areas.

项目综述

这个工程学生项目是为来自美国以外其他大学的本科生设计的为期两周（可延展为三周）的夏季课程。理工科背景的学生将参加由罗格斯大学工程学院杰出教职人员主持的前沿讲座，并参与具有实际项目实施的实验室研讨会。在闭幕典礼上，学生通过演示会展示他们在课程中所学到的知识。为了让学生沉浸式体验美国大学的校园生活，他们将有机会在访问期间与罗格斯学生互动。学生将通过参加为学术目的而设立的密集英语课程提高他们的英语综合能力。参与的学生还将通过文化活动以及对纽约、费城、波士顿或华盛顿地区的本地考察和实地考察了解美国的流行文化和历史。

Academic Lectures and Seminars (30%)

Given by experts and faculty from this field, the academic lectures and seminars cover fundamentals as well as frontiers in technology science and engineering. The learning goals of this component are for students to:

- Become familiar with a range of approaches to learning about engineering.
- Begin to think about their own research interests in relation to broader theoretical concepts and framework
- Develop critical perspectives on the existing theories and practices, and dominant assumptions about the application in engineering.

学术讲座和研讨会 (30%)

由工程领域的专家和教师提供的学术讲座和研讨会涵盖了本专业范围的基础知识以及前沿领域。该组成部分的学习目标是使学生能够：

- 熟悉多种学习科技和工程的方法
- 开始思考他们自己的研究兴趣与更广泛的理论概念和框架的关系
- 发展对现有理论和实践以及关于在实际工程中应用的辩证性思考。

Project-based Learning (30%)

Combine with the lectures and seminars, lab activities will be organized through following arrangements:

- Frontier laboratories visits
- Hands-on project (Robot building)
- Project demo and presentation
- Technical paper writing

项目实践 (30%)

除了课堂讲座和研讨会外，暑期学习还会安排组织科研实验活动，包括：

- 前沿实验室参观
- 小组实践项目（机器人制造）
- 项目演示和展示
- 技术论文撰写

Academic English Classes (20%)

The academic English classes provide students with expert academic language and culture instruction. Students will immerse themselves in the language environment in order to learn and understand disciplinary and institutional English and US culture more broadly. Classes features a breakdown of modules that focus on increasing students' oral, listening and reading comprehension to enhance students' academic English fundamentals. The goals of the classes are for students to:

- Develop and enhance academic listening and speaking skills
- Use English in professional and social situations
- Learn about note taking, pronunciation strategies and presentation skills

学术英语课程 (20%)

学术英语课程提供专业的学术语言和文化指导，使学生能够深入学习和理解学科和美国文化。学生将沉浸在语言环境中，以便更广泛地学习和理解学科和机构英语以及美国文化。课程包括一系列模块，重点增强学生的口语、听力和阅读理解能力，以加强学生的学术英语基础。课程的目标是让学生：

- 发展和提升学术听力和口语技能
- 在专业和社交场合中运用英语
- 学习笔记技巧、发音策略和演讲技巧

Culture Activities and Field Trips (20%)

In conjunction with academic components aforementioned, students will be immersed into the local culture through activities and excursions to enrich their overall time in the United States. Extracurricular activities include visits to elite universities such as Harvard University, MIT, Yale University, Columbia University and Princeton University. Students

will also visit key cultural attractions and sites including Johnson & Johnson Museum, Thomas Edison Historical National Museum and participate in intercollegiate athletics. Culture activities are typically arranged on weekdays while excursions are primarily on weekends.

文化活动和实地考察 (20%)

与上述学术内容相结合，学生将通过活动和实地考察融入当地文化，丰富他们在美国的整体体验。课外活动包括参观哈佛大学、麻省理工学院、耶鲁大学、哥伦比亚大学和普林斯顿大学等精英大学。学生还将参观重要的文化景点和场所，并参与校外体育活动。文化活动通常安排在工作日，而实地考察主要安排在周末。

Campus Immersion:

- Our visiting students will be accommodated at our student dorm (single/double room) and eating at the student dining hall.
- We will also apply for RU campus ID and NetID for them to access campus online resources and onsite facilities, i.e., libraries, gyms, museum, campus golf court, student cinema/theater, etc.
- Students will have the chance to engage with Rutgers students at our university.

沉浸式校园体验:

- 访问学生将被安排在大学的学生宿舍（单人/双人间），并在学生餐厅用餐。
- 可以申请罗格斯校园卡和 NetID，以便他们能够访问校园在线资源和现场设施，例如图书馆、健身房、博物馆、校园高尔夫球场、学生电影院/剧院等。
- 访问学生将有机会与罗格斯大学本校的学生互动。

主要学习内容:

- 机器学习与编程方法论
- 人工智能与大数据
- 自动机器人
- 智能制造
- 先进材料
- 可持续能源

A. 六节 Robotics lab 系列的产出是一个具备如下基础功能的智能小车:

1. 有基本驱动功能
2. 可自动分析空间/障碍
3. 可自动导航（设计路线）
4. 可自动驾驶/遥控驾驶

每节 lab session 都有不同的功能主题，形式都是学生先听教授和助教讲解，再动手操作自己的 project

B. 七节 Academic Workshop 系列

提供了机器学习和特别是深度学习的一般介绍。在这门课程中，学生将体验现代深度学习和机器学习的变革力量。该课程将从简要介绍 Linux 环境和 Python 编程语言开始，这是大多数机器学习算法的通用编程平台。然后将介绍机器学习的基础知识，并进行实践练习。除此以外，我们还将涵盖使用各种并行范式进行分布式神经网络训练的高级主题。最后部分介绍现下最火热的大型语言模型，以及总结该领域最新突破性成果的。

Sample Schedule: July-August, 2024

Sun	Mon	Tue	Wed	Thu	Fri	Sat
Day 1 Arrivals	Day 2 Breakfast Welcome and Introduction Campus Tour Lunch Academic Workshop 1 Welcome Dinner	Day 3 Breakfast Academic Workshop 2 Lunch Robotics Lab 1 Dinner	Day 4 Breakfast Academic Workshop 3 Lunch Robotics Lab 2 Dinner Golf Night	Day 5 Breakfast Academic English 1 Lunch Engineering Lab Visit 1 Dinner	Day 6 Breakfast Academic Workshop 4 Lunch Robotics Lab 3	Day 7 Day trip New York Back to NJ
Day 8 Day trip New York Back to NJ	Day 9 Breakfast Engineering Lab Visit 2 Lunch Academic Workshop 5 Dinner	Day 10 Breakfast Academic English 2 Lunch Robotics Lab 4 Dinner	Day 11 Breakfast Academic Workshop 6 Lunch Robotics Lab 5 Dinner Movie Night	Day 12 Breakfast Academic Workshop 7 Lunch Visit Princeton University Dinner	Day 13 Breakfast Robotics Lab 6 Lunch Group Presentation and Closing Ceremony	Day 14-15 Day trip to Philadelphia Back to NJ

Academic Activities:

Morning session: 9:30am - 12:00pm

Afternoon session: 1:30pm - 3:30/4:00pm