July 2023

The Interdisciplinary Program for Autonomous Systems and Robotics - List of Courses

- A student must study at least three courses from List A with at least 8 credit points in total
- A student must study at least one course from List C
- The rest of the credits can be taken from the three lists.
- Please note - up to two courses that are not on the list can be requested, but will only be approved after receiving a letter of recommendation from the advisor and approval by the TASP Advanced Studies Committee.

- Courses marked with * are rarely taught, only every few years and not regularly.

List A: Core Courses

Academic points	Course Name	Faculty	Course Number
2.5	Kinematics Dynamics & Control of Robots	Mechanical Engineering	036026
3	Robot Path-planning and Sensor Based Nav	Mechanical Engineering	036044
2.5	Neural Networks For Control/diagnostic	Mechanical Engineering	036049
3	Kinematics in Biomechanics and Robotics	Mechanical Engineering	036072
3	Hybrid Dynamics in Mechanical Systems	Mechanical Engineering	036087
2	Advanced Topics in Robotics	Mechanical Engineering	038785
3.5	Machine Learning	Electrical and Computer Engineering	046195
3	Image Processing and Analysis	Electrical and Computer Engineering	046200
3	Introduction to Robotics	Electrical and Computer Engineering	046212
3	Deep Learning	Electrical and Computer Engineering	046211
2	Est. Identification in Dynamic Systems	Electrical and Computer Engineering	* 048825
3	Networked Dynamic Systems	Aerospace Engineering	086730
3	Vision-aided Navigation	Aerospace Engineering	086761
3	Autonomous Navigation and Perception	Aerospace Engineering	086762
3	Fundamentals in Estimation Theory	Aerospace Engineering	086777
3.5	Foundations and Applications of Artifici	Data and Decision Sciences	096210

3.5	Deep Learning	Data and Decision Sciences	097200
2.5	Cognitive Robotics	Data and Decision Sciences	097244
3	Introduction to Data Processing and Representation	Computer Science	236201
3	Introduction to Artificial Intelligence	Computer Science	236501
3	Introduction to Machine Learning	Computer Science	236756
3	Digital Image Processing	Computer Science	236860
3	Geometric Computer Vision	Computer Science	236861
3	Sparse and Redundant Representations	Computer Science	236862
3	Computer Vision	Computer Science	236873
3	Introduction to Robotics	Computer Science	236927

List B: Advanced Elective Courses

Academic points	Course Name	Faculty	Course Number
2.5	Navigation and Inertial Systems	Civil and Environmental Engineering	016832
3	Systems and Control	Civil and Environmental Engineering	* 017003
3	Design of Control Systems	Civil and Environmental Engineering	* 017004
2.5	Selected Subjects in Vehicle Dynamics	Civil and Environmental Engineering	* 017010
2	Advanced Image Acquisition Methods	Civil and Environmental Engineering	018818
2.5	Multi Dimensional Remote Sensing	Civil and Environmental Engineering	018819
2	Advanced Application of Navigation Sys.	Civil and Environmental Engineering	* 018827
3	Advanced Topics in Collabortive Artifici	Computer Science	236203
3	Advanced Topics Ingeometric Deep Learning	Computer Science	236205
3	Digital Geometry Processing	Computer Science	236329
3	Project in Computer Communication	Computer Science	236340
3	Distributed Systems	Computer Science	236351
2	Advanced Topics in Distributed Algorithm	Computer Science	236358

3	Pro. in Parallel/distributed Programming	Computer Science	236371
3	Advanced Topics in Comp. Vision	Computer Science	236627
3	Advanced Topics in Robotics L+t	Computer Science	236643
3	Project in Intelligent Systems	Computer Science	236754
3	Deep Learning On Computation	Computer Science	236781
2	Seminar in Image Processing	Computer Science	236821
2	Seminar in Robotics	Computer Science	236824
3	Project in Computer Vision	Computer Science	236874
3	Visual Recognition	Computer Science	236875
2	Algorithmic Robot Motion Planning	Computer Science	236901
3	Linear Control Systems	Mechanical Engineering	036012
3	Process Optimization	Mechanical Engineering	036013
2.5	Computational Geometry 1	Mechanical Engineering	036020
3	Control of Structures and Mechanical	Mechanical Engineering	036039
3	Analysis of Nonlinear Vibrations.	Mechanical Engineering	036048
3	Nonlinear Control Systems	Mechanical Engineering	036050
3	Info-gap Anlaysis of Risk and Reliability	Mechanical Engineering	036057
3	Biological Movement Control	Mechanical Engineering	036092
3	Robust Guidance and Control Via Min-max	Mechanical Engineering	038781
3	Introduction to Chaotic Dynamical System	Mechanical Engineering	038786
3	Time-delays in Control and Estimation	Mechanical Engineering	038806
3	Advanced Issues in Design and Production	Education in Science and Technology	216144
2	Deep Learning Applications in Mri	Biomedical Engineering	336028
2.5	Ultrasound in Medicine Priniples Appl.	Biomedical Engineering	336325
2.5	Principles of Medical Imaging	Biomedical Engineering	336502
3	Introduction to Control in Bio-medical	Biomedical Engineering	336522
3	Machine Learning in Healthcare	Biomedical Engineering	336546
3	Planning and Reinforcemet Learning	Electrical and Computer Engineering	046203

3	Control Systems 2	Electrical and Computer Engineering	046192
3	Nonlinear Control Systems	Electrical and Computer Engineering	* 046196
3	Computational Methods in Optimization	Electrical and Computer Engineering	046197
3	Data Analysis	Electrical and Computer Engineering	046202
3	Mobile Robots	Electrical and Computer Engineering	046213
3	Distributed System Principles	Electrical and Computer Engineering	046272
3	Information Theory	Electrical and Computer Engineering	046733
3	Algo and App. in Computer Vision	Electrical and Computer Engineering	046746
2	Reliability in Modern Machine Learning	Electrical and Computer Engineering	048100
2	Image Processing	Electrical and Computer Engineering	048860
2	Statistical Methods in Image Processing	Electrical and Computer Engineering	048954
2	Three-dimensional Image Reconstruction	Electrical and Computer Engineering	049062
2	Variational Methods in Image Processing	Electrical and Computer Engineering	049064
3	Embedded Computer Systems Analysis	Aerospace Engineering	086222
3	Control of Multi-input Multi-output System	Aerospace Engineering	086289
3	Satellite Orbit Control	Aerospace Engineering	086290
3	Random Processes in Aerospace Systems	Aerospace Engineering	086733
3	Dynamics and Control of Flight Vehicles	Aerospace Engineering	086755
3	Navigation Systems	Aerospace Engineering	086759
3	Principles of Guidance and Homing	Aerospace Engineering	086760
2	Missile Guidance Analysis	Aerospace Engineering	* 088211
3	Optimal Control in Flight Systems 1	Aerospace Engineering	088751
3	Advanced Topics in Missile Guidance	Aerospace Engineering	* 088759
3	Robust Control	Aerospace Engineering	088792

3	Distributed Spacecraft Systems	Aerospace Engineering	088900
3.5	Automatic Planning	Data and Decision Sciences	096208
2.5	Distributed Artificial Intelligence	Data and Decision Sciences	097210
2.5	Natural Language Processing	Data and Decision Sciences	097216
2.5	Computer Vision ¸ Surgical Applications	Data and Decision Sciences	097222
3	Computer Vision ¸ Surgical Applications	Data and Decision Sciences	097235
3	Internet of Things: Technology and Data	Data and Decision Sciences	097247
2.5	Cooperative Game Theory	Data and Decision Sciences	097317
2.5	Topics in Human-AI Interaction	Data and Decision Sciences	098920

List C: Basic Quantitative Courses

Academic points	Course Name	Faculty	Course Number
3	Fundamental Mathematics For Engineers	Civil and Environmental Engineering	019001
3	Numerical Methods in Engineering	Civil and Environmental Engineering	019003
3	Selected Topics in Statistics	Civil and Environmental Engineering	019007
4	Analytical Methods in Mechanical Eng.1	Mechanical Engineering	036001
3	Analytical Methods in Mechanical Eng. 2	Mechanical Engineering	036002
3	Foundations of Stochastic Processes	Electrical and Computer Engineering	046868
3	Numerical Methods in Aero Eng.	Aerospace Engineering	086172
3.5	Nonlinear Models in Operations Research	Data and Decision Sciences	096327
3.5	Non-cooperative Games	Data and Decision Sciences	096575
2.5	Algebriac Methods For Integer Progrmming	Data and Decision Sciences	097334

3.5	Optimization 1	Data and Decision Sciences	098311
3.5	Stochastic Processes	Data and Decision Sciences	098413
3	Theory of Statistics	Data and Decision Sciences	098414
3	Theory of Probability	Data and Decision Sciences	098416
3	Mathematical Logic	Mathematics	106156
3	Game Theory	Mathematics	106173
3	Advanced Probability	Mathematics	106349
3	Algebraic Topology	Mathematics	106383
3	Matrix Theory	Mathematics	106393
2.5	Elements of Modern Analysis For Electri.	Mathematics	108324
2.5	Functional Analysis For E.e.	Mathematics	108327
3	Complexity Theory	Computer Science	236313
3	Theory of Computation	Computer Science	236343
3	Numerical Algorithms M	Computer Science	238125