



MIT EECS

Electrical
Engineering

Computer
Science

Artificial Intelligence +
Decision-making

The TECHNICAL QUALIFYING EVALUATION (TQE): Instructions

Academic Year 2024-2025 EFFECTIVE SPRING 2024

Graduate students enrolling in fall 2024 are expected to submit their TQE plan by February 1st, 2025. Four subjects are required: two subjects from a single Group and two subjects from two other Groups. TQE plans may be submitted online at https://eecs.mit.edu/phd_status.cgi

Once you enter your TQE plan into the portal, your graduate counselor will approve your submission online or offer other suggestions. Once agreed upon by you and your graduate counselor, your TQE plan will be monitored by the Graduate Office. If you need to change your submitted TQE plan, please see the appropriate administrative staff in the EECS Graduate Office. [Note: modifications to the TQE grid are made every fall and spring term.]

NOTES

GROUP 1: SYSTEMS in CS			
Subj # (old #)	Title	Offered	Comments
6.5110 (6.820)	Foundations of Program Analysis [xor 6.5120]	Fall	
6.S981	Introduction to Program Synthesis [xor 6.5110]	Fall	Not Offered AY24/25
6.5820 (6.829)	Computer Networks	Fall	
6.5830 (6.830)	Database Systems	Fall	
6.5900 (6.823)	Computer System Architecture	Fall	
6.5940	Tiny ML and Efficient Deep Learning Computing	Fall	NEW
6.5080 (6.836)	Multicore Programming	Spring	
6.5120 (6.822)	Formal Reasoning about Programs [xor 6.5110]	Spring	
6.5610	Applied Cryptography and Security [xor 6.5620]	Spring	
6.5660 (6.858)	Computer Systems Security	Spring	
6.5840 (6.824)	Distributed Computer Systems Engineering	Spring	
6.5910 (6.375)	Complex Digital Systems Design	Spring	Next Offering Unknown
6.5930 (6.825)	Hardware Architecture for Deep Learning	Spring	
6.5950 (6.S983)	Secure Hardware Design	Spring	
6.8530 also 6.C85	Interactive Data Visualization	Spring	

GROUP 2: THEORETICAL COMPUTER SCIENCE (*see notes below)			
Subj # (old #)	Title	Offered	Comments
6.5210* (6.854)	Advanced Algorithms	Fall	
6.5240	Sublinear Time Algorithms	Fall	NEW
6.5250 (6.852)	Distributed Algorithms	Fall	
6.5400* (6.840)	Theory of Computation	Fall	
6.5620 (6.875)	Cryptography and Cryptanalysis [xor 6.5610]	Fall	
6.5220 (6.856)	Randomized Algorithms	Spring	Not Offered AY24/25
6.5320 (6.850)	Geometric Computing	Spring	Not Offered AY24/25
6.5410* (6.841)	Advanced Complexity Theory	Spring	
*6.5400 or 6.5210 are recommended for students who plan to take only one subj in Group 2			
*for students with a strong background in the area, 6.5410 may substitute 6.5400			

GROUP 3: ARTIFICIAL INTELLIGENCE (AI) (*see note below)			
Subj # (old #)	Title	Offered	Comments
6.4212 (6.843)	Robotic Manipulation [xor 6.8210]	Fall	
6.7810 (6.438)	Algorithms for Inference [xor 6.7800 xor 6.7900]	Fall	
6.7900 (6.867)	Machine Learning [xor 6.7800 xor 6.7810]	Fall	
6.7960	Deep Learning	Fall	
6.8610 (6.864)	Quantitative Methods for Natural Language Processing [xor 6.8620 xor 6.8630]	Fall	
6.8700 (6.878)	Advanced Computational Biology: Genomes, Networks, Evolution [xor 6.8710]	Fall	
6.7800 (6.437)	Inference and Information [xor 6.7810 xor 6.7900]	Spring	
6.7930 (6.871)	Machine Learning for Healthcare	Spring	
6.8200 (6.884)	Sensorimotor Learning	Spring	
6.8210 (6.832)	Underactuated Robotics [xor 6.4212]	Spring	
6.8300 (6.869)	Advances in Computer Vision	Spring	
6.8410 (6.838)	Shape Analysis	Spring	
6.8420 (6.839)	Computational Design and Fabrication	Spring	
6.8620 (6.345)	Spoken Language Processing [xor 6.8630 xor 6.8610]	Spring	Not Offered AY24/25
6.8630 (6.863)	Natural Language and the Computer Representation of Knowledge [xor 6.8610 xor 6.8620]	Spring	
6.8710 (6.874)	Computational Systems Biology: Deep Learning in the Life Sciences [xor 6.8700]	Spring	
*6.8420 can be used as the second AI subject, but not the only subject.			

GROUP 4: SYSTEM SCIENCE and CONTROL ENGINEERING			
Subj # (old #)	Title	Offered	Comments
6.7000 (6.341)	Discrete-Time Signal Processing [xor 6.7010 xor 6.8800]	Fall	
6.7200 (6.255)	Optimization Methods [xor 6.7210]	Fall	
6.7210 (6.251)	Introduction to Mathematical Programming [xor 6.7200]	Fall	
6.7010 (6.344)	Digital Image Processing [xor 6.7000 xor 6.8800]	Spring	
6.7100 (6.241)	Dynamic Systems and Control	Spring	
6.8800 (6.555)	Biomedical Signal and Image Processing [xor 6.7000 xor 6.7010]	Spring	Not Offered AY24/25

GROUP 5: CIRCUITS and ELECTRONIC SYSTEMS			
Subj # (old #)	Title	Offered	Comments
6.6010 (6.374)	Analysis and Design of Digital Integrated Circuits	Fall	
6.6020	High-Frequency Integrated Circuits (was High Speed Communication Circuits)	Fall	
6.7300 (6.336)	Introduction to Modeling and Simulation	Fall	
6.6000 (6.775)	CMOS Analog and Mixed-Signal Circuit Design	Spring	
6.6220 (6.334)	Power Electronics	Spring	

GROUP 6: INFORMATION SCIENCE and COMMUNICATION			
Subj # (old #)	Title	Offered	Comments
6.7410 (6.450)	Principles of Digital Communication	Fall	
6.7420 (6.267)	Heterogenous Networks: Architecture, Transport, Protocols and Management	Fall	
6.7470 (6.441)	Information Theory	Fall	Not Offered AY24/25
6.7480	Information Theory: from Coding to Learning	Fall	NEW FALL 2024
6.7700 (6.436)	Fundamentals of Probability	Fall	
6.7810 (6.438)	Algorithms for Inference [xor 6.7800]	Fall	
6.7710 (6.262)	Discrete Stochastic Processes [xor 6.7720]	Spring	
6.7720	Discrete Probability and Stochastic Processes [xor 6.7710]	Spring	
6.7800 (6.437)	Inference and Information [xor 6.7810]	Spring	

GROUP 7: BIOLOGICAL ENGINEERING			
Subj # (old #)	Title	Offered	Comments
6.4822 (6.522)	Quantitative Physiology: Organ Transport Systems	Fall	
6.8810 (6.556)	Data Acquisition and Image Reconstruction in MRI	Fall	Not Offered AY24/25
6.C67	Computational Imaging: Physics to Algorithms	Fall	NEW; Pilot Offering
6.4812 (6.521)	Cellular Neurophysiology and Computing	Spring	

GROUP 8: ELECTROMAGNETICS			
Subj # (old #)	Title	Offered	Comments
6.4832 (6.561)	Fields, Forces and Flows in Biological Systems	Fall	
6.6210 (6.640)	Electromagnetic Fields, Forces and Motion [xor 6.6280]	Fall	
6.6300 (6.630)	Electromagnetics	Fall	
6.6310 (6.631)	Optics and Photonics	Fall	
6.7121 (6.S967)	Principles of Modeling, Computing and Control of Decarbonized Electric Energy Systems	Fall	
6.6280 (6.685)	Electric Machines [xor 6.6210]	Fall	Next Offering Unknown
6.6340 (6.634)	Nonlinear Optics	Spring	

GROUP 9: PHYSICAL SCIENCE and ENGINEERING			
Subj # (old #)	Title	Offered	Comments
6.6400 (6.728)	Applied Quantum and Statistical Physics	Fall	
6.6500 (6.720)	Integrated Microelectronic Devices	Fall	
6.S063	Principles/Applications of Quantum Optics: Fundamentals and Emerging Technologies	Fall	NEW Fall 2025; Pilot Offering
6.S976	Silicon Photonics	Spring	Pilot Offering
6.6510 (6.730)	Physics for Solid-State Applications	Spring	
6.S966	Symmetry and its Application to Machine Learning	Spring	NEW; Pilot Offering
6.S987	Physics and Engineering of Superconducting Qubits	Spring	



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