INDIAN INSTITUTE OF TECHNOLOGY GANDHINAGAR

ADVISORY ON MINORS

(As approved by Senate in its 61st meeting held on 15th November 2022 and updated in its 66th/67th meetings)

IIT Gandhinagar provides a variety of **options for additional learning** to undergraduate students including the opportunity to pursue minors in other disciplines.

A student admitted from AY 2022-23 can receive a minor in another discipline/focus area, if they complete a **minimum of 20 additional credits** of **courses specified by that discipline/focus area group**, over and above the requirements of the base programme. Two open electives from the base programme, if it qualifies, may be counted in the 20 additional credits which are needed for a Minor for this student group.

Students admitted before AY 2022-23 can receive a minor in another discipline, if they, in addition to the requirements of the base level BTech degree, complete **20 credits of courses** from another discipline which enhance their core competence in that discipline. One of the open elective courses of base programme, if it qualifies, may be counted towards Minor, in which case the requirement of open electives will reduce to 12 credits.

The Institute currently offers minor in the following areas/disciplines:

Sl. No.	Minor
1	Artificial Intelligence
2	Automobile Engineering
3	Biological Engineering
4	Chemical Engineering
5	Chemistry
6	Civil Engineering
7	Cognitive Science
8	Computer Science and Engineering
9	Data Analytics
10	Design
11	Earth Sciences
12	Electrical Engineering
13	Humanities and Social Sciences
14	Management
15	Materials Engineering
16	Mathematics
17	Mechanical Engineering
18	Physics
19	Robotics
20	Safety Engineering
21	Sustainable Development

Courses Specified by the Discipline/Focus Area Group

A. Minor in Robotics [Ref: Senate 2020.4.15]

- For minors in Robotics, the following courses are permitted to be counted towards the minor (as long as they are beyond the required curriculum of the individual student's programme) subject to the condition that at least one out of ME 639 and ES 408 must be completed.

Course Code	Current Title of the Course
ME 639	Introduction to Robotics
ES 408	Mechatronics
ES 332	Control Systems
ME 322	Synthesis and Analysis of Mechanisms
ES 321	Dynamics and Vibration
ES 613	Modern Control Theory
ES 616	Digital Control Systems
EE 645	3D Computer Vision
ES 637	Mathematical Foundations for Comp. Vision and Graphics
ES 642	Control of Nonlinear Dynamical Systems
ES 641	Electronic Instrumentation

- This area tends to be a project-heavy, and up to 8 credits of independent project courses or special topics courses may be considered as part of the minor based on the recommendation of the appropriate Head of Department and Dean of Academic Affairs.

B. Minor in Sustainable Development

- For minor in Sustainable Development, students should take 20 credits of courses from the list given below. This should include courses from at least two different thematic areas (Water; Pollution & Waste Management; Energy; Environment/ Biodiversity/ Earth Systems).

Course Code	Current Title of the Course	Thematic Area
CE 605	Remote Sensing of Land and Water Resources	Water
CE 611	Advanced Engineering Hydrology	Water
CE 634	Air Pollution Control Engineering	Pollution & Waste Management
CE 637	Infrastructure Systems: Planning and Management	Water
CE 691-VI	Special Topics in Civil Engineering: Domestic Wastewater Engineering (Treatment and Reuse)	Pollution & Waste Management
CE 691-VII	Special Topics in Civil Engineering: Engineering Practices in Drinking Water Treatment	Pollution & Waste Management
EE 426	Electric Vehicle Technology	Energy
EE 691-V	Special Topics in Electrical Engineering: Regulation of Electric Sector	Energy
EE 691-VII	Special Topics in Electrical Engineering: Economics of Regulation in India	Energy
EH 602	River Morphology and Ecology	Water
EH 605	Modelling of Earth System & Sustainability	Environment/ Biodiversity/ Earth Systems
EH 608	Biodiversity Conservation and Sustainable Development	Environment/ Biodiversity/ Earth Systems
EH 612	Ocean and Global Change	Water
EH 691	Data Analysis for Earth System Sciences	Environment/ Biodiversity/ Earth Systems
ES 632	Energy Systems	Energy
ES 635	Water Quality Engineering	Pollution & Waste Management
ES 663	Smart Renewable Energy Systems	Energy
ES 665	Advanced Transportation Electrification Technology	Energy
HS 515	Politics of the Environment	Environment/ Biodiversity/ Earth Systems
IN 304	Ancient Indian Technology	Environment/ Biodiversity/ Earth Systems

C. Minor in Computer Science and Engineering [Ref: Senate 2023.4.12]

The courses specified by the Department of Computer Science and Engineering for a minor in Computer Science and Engineering are as follows:

- **ES 242: Data Structures & Algorithms I** (4 credits) will be mandatory for a minor in Computer Science and Engineering except for students who are pursuing a BTech with an AI Major. For students who are pursuing a BTech in AI Major, ES 242 is a mandatory requirement for their AI Major.

- Additionally, at least **two core courses of Computer Science and Engineering** from the list given below (which are not a requirement of the base programme) must be taken.

Course Code	Current Title of the Course
ES 214	Discrete Mathematics
ES 204	Digital Systems
TBD	Computer Organization & Architecture
TBD	Operating Systems
CS 201	Theory of Computing
TBD	Software Tools and Techniques Lab
TBD	Computer Networks
CS 329	Foundations of AI: Multiagent Systems

- Other **two courses can be any from CS or other courses prescribed by the Department of Computer Science and Engineering**, including the ones above.

- **At most one CS 299/399/499 course** can be counted towards the requirement of a minor in Computer Science and Engineering. Students are usually expected to take project courses after completing Data Structures & Algorithms I and at least one more CS course.

D. Minor in Artificial Intelligence [Ref: Senate 2023.5.7]

The courses specified by the Department of Computer Science and Engineering for a minor in Artificial Intelligence are as follows:

- **CS 303: Mathematical Foundations for AI** (4 credits) will be mandatory for a minor in Artificial Intelligence.

- Additionally, at least two core courses of Artificial Intelligence from the list given below, which are not a requirement of the base programme must be taken.

Course Code	Current Title of the Course
ES 204	Digital Systems
ES 242	Data Structures & Algorithms I
ES 244	Signals, Systems & Random Processes
ES 245	Control Systems
ES 335	Machine Learning
CS 201	Theory of Computing
CS 328	Introduction to Data Science
CS 329	Foundations for AI: Multiagent Systems
TBD	AI Software Tools & Techniques
TBD	Computer Organization & Architecture

- Other **two courses can be any from discipline-specific electives of AI/selected other courses**, including the ones above.

- **At most one CS 299/399/499 course** can be counted towards the requirement of a minor in Artificial Engineering. Students are usually expected to take project courses after completing at least two AI courses.