广东以色列理工学院数学与应用数学[1]专业人才培养方案

（专业代码：070101H）

一、 概述

本专业具有学科基础扎实、应用范围广泛的特点。专业特色在于立足富有深度与广度的课程体系，融合高水平的数学学科与计算机科学学科的专业教育。优秀本科生可参与专业教授指导的研究项目。在修业年限内学成的学生将获颁以色列理工学院学士学位证书，以及广东以色列理工学院本科毕业证书、学士学位证书。

二、培养目标

通过学习并整合数学和计算机科学学科知识，毕业生将能够掌握专业领域（特别是计算机科学领域）的前沿知识，并在高科技行业、经济学（例如精算学）、数据科学和人工智能等多个领域就业。具体来说，本专业毕业生能够将所获得的高水平数学知识和数学思维训练成果，以及计算机科学的专业教育，用于解决高科技行业中出现的各类问题。毕业生不仅可以从事编程工作，而且更重要的是，他们还可以参与解决相关实际问题所需软件的科学研究和算法开发。

学习深造方面，学生可以选择理论数学和应用数学、计算机科学、数据科学、经济学、理论物理等领域的研究生项目。

三、毕业学分要求

四年制本科专业的总学分为 133 学分，含 2 个学分的体育课。学生还需修满教育部规定的思想政治理论课程学分，并达到考核合格标准。

四、修业年限

四年，授予广东以色列理工学院数学与应用数学专业理学学士学位，以色列理工学院 Mathematics with Computer Science 学士学位。

五、人才培养基本要求

1. 使学生接受系统的数学思维训练，掌握数学科学的思想方法，具有较扎实的数学基础和较强的数学语言表达能力。

2. 具备数学研究或运用数学知识解决实际问题的初步能力。

3. 了解数学的历史概况和广泛应用，以及当代数学的新进展。

1.以色列理工学院对应专业名称为“Mathematics with Computer Science，数学与计算机科学”。

4. 掌握资料查询、文献检索以及运用现代技术获取相关信息的基本方法。

5. 熟练使用计算机，达到良好的计算机水平，了解计算机学科的发展现状和趋势。

6. 采用全英授课模式，使用英文原版教材，培养学生英语思维与逻辑能力，使学生具备在英语国家大学就读所需的同等语言水平。学生应当具有一定的国际视野和跨文化交流、竞争与合作能力。

六、毕业要求

本专业学生在规定年限内完成教学计划要求，取得不少于规定的 133 学分（包括专业核心课程 113.5 学分，专业选修课程 13.5 学分以及通识选修课程 6 学分），并且每门课程达到 55 分以上，GPA 达 65 分以上，满足教育部规定的思想政治理论课的学分要求，可经审核准予毕业。

七、基本信息资源

以手册、网站等形式，提供本专业的培养方案，各课程的教学大纲、教学要求、考核要求、毕业审核标准等基本教学信息。

八、教材及参考书

选用反映国际水平的外文版教材，有利于稳妥地开展双语或全英文教学。

数学与应用数学专业课程目录 [2]

专业必修课	113.5 分
专业选修课	13.5 分
通识选修课	6 分
总分	**133 分**

课程代码	课程名称 （专业核心课程）	学分
第一学期		
104002	基本数学概念	2.5
104166	线性代数 A	5.5
104195	微积分 1	5.5
104814	计算机科学导论 M	4
324033	专业英语 – 高级 B	3
394800	体育	1
	总学分	**21.5**
第二学期		
104168	线性代数 B	5
104281	微积分 2	5
104286	组合数学	2.5
104824	系统编程概论	4
394800	体育	1
	总学分	**17.5**
第三学期		
104295	微积分 3	5
104293	集合论	2.5
104918	数据结构 1	3
104952	数字系统与计算机架构	5
104222	概率论	3.5
	总学分	**19**
第四学期		
104158	群论（导论）	3.5
104291	组合演算法	3.5
104122	函数理论 1（复变函数）	3.5
104285	常微分方程 A	3.5
104818	计算机组织与编程	3
	总学分	**17**
第五学期		
104279	环与域导论	2.5

2.开设课程与学期根据以色列理工学院教学计划与实际教学安排可能进行动态调整。

104294	数值分析概论	5
104823	操作系统	4.5
114071	物理学 1M	3.5
	科学选修课	2-5
	总学分	**17.5-20.5**
第六学期		
104142	度量与拓扑空间	3.5
104192	应用数学概论	3
104280	模、环和群	3
104274	域论	
114052	物理学 2	3.5
	计算机科学选修课	3
	总学分	**16**
第七学期		
104165	实分析	3.5
106156	数理逻辑	3
104177	微分几何	3.5
	数学或计算机科学选修课	3-5
	总学分	**13-15**
第八学期		
	数学或计算机科学选修课	3-5
	数学或计算机科学选修课	3-5
	总学分	**6-10**

GTIIT Cultivation Scheme of Mathematics with Computer Science Program

1. Program Positioning

The study program Mathematics with Computer Science (MCS) Program has the characteristics of strong foundation of the relevant disciplines and wide application range. The novelty of the program is a combination of high-level education in Mathematics in terms of depths of the courses and their wide scope together with a strong education both theoretical and professional in Computer Science. The program exposes the stronger students to research projects supervised by experienced professors. Students who complete their studies within the prescribed period will be awarded a bachelor's degree from the Technion, as well as a bachelor's degree and a graduation certificate from the Guangdong Technion-Israel Institute of Technology (GTIIT).

2. Talent-cultivation Goal

By mastering the combination of the disciplines, mathematics and computer science, graduates from the program will have access to a wide range of positions in the high-tech industry, economics (e.g. actuarial science), data science and AI. With this particular combination of Math with CS offered by the program, graduates will be able to master along their work after the graduation up to date developments in the professional world and in particular in the area of Computer Science.

As for further studies, students are welcome by prestigious graduate programs in areas as pure and applied Mathematics, Computer Science, Data Science, Economics, Theoretical Physics, etc.

3. Total Credits for Graduation

The total credits of the 4-year undergraduate program are 133, including 2 credits of physical education courses. Students are also required to complete the credits in ideological and political theory courses as stipulated by the Ministry of Education of China (MOE) and meet the passing assessment standards.

4. Study Years

4 years, students will be awarded the bachelor's degree in Mathematics and Applied Mathematics of GTIIT, and the bachelor's degree in Mathematics with Computer Science from the Technion.

5. Basic Requirements for Talents Cultivation

a. Students will undergo systematic training in mathematical thinking, master the methodologies of mathematical sciences, and possess a solid foundation in mathematics as well as strong mathematical language expression skills.
b. Students will have the preliminary ability to conduct mathematical research or apply mathematical knowledge to solve practical problems.
c. Students will be familiar with the historical overview of mathematics and its wide applications, as well as the latest advancements in contemporary mathematics.
d. Students will master the basic methods of information retrieval, literature search, and the use of modern technology to obtain relevant information.
e. Students will be proficient in the use of computers, achieving a good level of computer literacy, and be aware of the current state and trends in the development of computer science.
f. Adopt a full English teaching model, using English-language original textbooks to cultivate students' English thinking and logical abilities, ensuring they have the equivalent language level required for studying at universities in English-speaking countries. Students will have a certain international perspective and the ability to engage in cross-cultural communication, competition, and cooperation.

6. Graduation Requirements

Students must complete the required credits stipulated by the teaching plan within the prescribed years, obtaining no less than the specified 133 credits (including 113.5 credits for program core courses, 13.5 credits for elective courses, and 6 credits for general education). Additionally, each course must be passed with a minimum grade of 55, and the GPA above 65. Fulfilling the requirement of MOE ideological and political theory courses, students may be approved for graduation upon review.

7. Basic Information Resources

The program cultivation scheme, syllabus, teaching requirements, assessment criteria, graduation evaluation standard, as well as other fundamental teaching information, are available in the form of brochures, websites, etc.

8. Textbooks and References

The selection of textbooks that reflect international standards, particularly those in foreign languages, is conducive to the stable implementation of bilingual or fully English-medium instruction.

Mathematics with Computer Science Program Curriculum[3]

Compulsory Courses	113.5	points
Program Elective Courses	13.5	points
General Elective Courses	6	points
TOTAL	**133**	**points**

Course Code	Course Name (Program Core Course)	Credits
Semester 1		
104002	Basic Concepts in Mathematics	2.5
104166	Algebra A	5.5
104195	Infinitesimal Calculus 1	5.5
104814	Introduction to Computer Science M	4
324033	Technical English - Advanced B	3
394800	Physical Education Course	1
	Total	**21.5**
Semester 2		
104168	Algebra B	5
104281	Infinitesimal Calculus 2	5
104286	Combinatorics	2.5
104824	Introduction to Systems Programming	4
394800	Physical Education Course	1
	Total	**17.5**
Semester 3		
104295	Infinitesimal Calculus 3	5
104293	Set Theory	2.5
104918	Data Structures 1	3
104952	Digital Systems and Computer Structure	5
104222	Probability Theory	3.5
	Total	**19**
Semester 4		
104158	Introduction to Groups	3.5
104291	Combinatorial Algorithms	3.5
104122	Functions Theory 1	3.5
104285	Ordinary Differential Equations A	3.5
104818	Computer Organization and Programming	3
	Total	**17**
Semester 5		

3. Course offerings and scheduling may be properly adjusted in accordance with the Technion's academic plan and actual teaching arrangements.

104279	Introduction to Rings and Fields	2.5
104294	Introduction to Numerical Analysis	5
104823	Operating Systems	4.5
114071	Physics 1M	3.5
	Elective Science	2-5
	Total	**17.5-20.5**
Semester 6		
104142	Metric and Topological Spaces	3.5
104192	Introduction to Applied Mathematics	3
104280	Modules, Rings and Groups OR	3
104274	Fields Theory	
114052	Physics 2	3.5
	Elective Computer Science	3
	Total	**16**
Semester 7		
104165	Real Functions	3.5
106156	Mathematical Logic	3
104177	Differential Geometry	3.5
	Elective Math or Computer Science	3-5
	Total	**13-15**
Semester 8		
	Elective Math or Computer Science	3-5
	Elective Math or Computer Science	3-5
	Total	**6-10**