Appendix I: Coursework

Full-time students enrolled in the TBSI Master Program are required to take a minimum of 24 units of coursework (minimum of 26 units for International Students), including a minimum of 7 units of common mandatory courses (9 units for International Students), 2 units of mandatory sessions, and a minimum of 15 units of technical courses from selected educational concentration. These 15 technical credits include at least 9~12 major units and 3~6 cross units.

1) Common Mandatory Courses

- Social Science [5units]

  1）Political Theory Courses[a]:

  - Theory and Practice of Socialism with Chinese Characteristics (60680012)__[2 units]
  - Introduction to Dialectics of Nature (60680021)_____[1 unit]

  2）English Academic Writing and Communication (76000102)_____[2 units]

- Chinese Language [2 units] Only for International Students

  International students must meet the Chinese Language requirement by providing proofs of Chinese language proficiency or taking Chinese Course, depending on the students' Chinese language level.

- Professional Development [1 unit]

  - Professional Development and Presentation (66000022)_____[2 units]
  - Creative Innovation, Entrepreneurship and Venture Capital (66000011)_____[1 unit]

- Capstone Project[b] [1 unit]

  · Capstone Project (76000041)_____[1 unit]

2) Mandatory Sessions [2 units]

- Literature Review & Report on Thesis Topic Selection (69990021)_____[1 unit]
- Academic Activity[c] (69990031)_____[1unit]

3) Technical Courses from Selected Educational Concentration [minimum of 15units]

- Major "M" courses under the selected concentration_____[9~12 units]

■ Cross "C" courses under the selected concentration_____[3~6 units]

Note:

All master's students must finish one 1-credit 100-level course from selected concentration (track). This one credit can be used as either a major or cross credit, but not both.

Upon the approval of advisor(group) and CSE, a student can replace at most 3 major units by cross units, or replace at most 3 cross units by major units.

In addition to the courses listed in the following table, upon the approval of advisor(group), other technical courses within TBSI and no more than 3 units of courses from other non-TBSI programs at Tsinghua Shenzhen International Graduate School (Tsinghua SIGS) and Graduate School at Shenzhen, Tsinghua University may also meet certain unit requirements

4) Complementary Courses

Master's students without prerequisite background knowledge or undergraduate course(s) will be required by advisor(group) to take complementary course(s) which cannot be counted as the technical course credits for fulfilling the M.S. coursework requirement.

(a) Note: Students from Hong Kong, Macau, and Taiwan can choose the listed political theory courses; or they can take courses listed under "General Introduction of China" (Course No. 00000007, 2-3 units) to replace the political theory courses, and after taking these courses, technical courses can be taken to make up the remaining units.

International students can choose courses listed under "General Introduction of China" (Course No. 00000007, 2 to 3 units) to replace the political theory courses. After taking these courses, technical courses can be taken to make up the remaining units.

Detailed requirements and list of "General Introduction of China" courses can be found in the document "Overview of the Courses Exempted for Students from Hong Kong, Macau, and Taiwan, and International Students (Postgraduate) of Tsinghua University".

(b) Note: Students are encouraged to form interdisciplinary teams to study and try to solve interdisciplinary open problems or industry-involved projects.

(c) Note: TBSI encourages Master students to attend academic activities. The academic activity requirement includes three categories. The first category consists of important and mandatory activities, which are organized by TBSI; and all students must participate. The second category is academic integrity and ethics. All students must fulfill the academic integrity and ethics requirement by taking either two seminars on academic integrity and/or work ethics hosted at TBSI or a course on academic integrity and/or ethics at TBSI or Tsinghua SIGS or Graduate School at Shenzhen, Tsinghua University The third category is a series of research

seminars. Students must attend at least 8 seminars per semester. Students should write a brief summary with no less than 300 words for each seminar attended. A final report containing all summaries and proofs of attendance must be submitted to SEO at the end of each semester. This Academic Activity course is held every semester and will be graded as Pass or Fail. Students could earn at most 1 unit per year.

Appendix Ⅱ. Course List for Nine Educational Concentrations

The following table lists all TBSI technical courses. Whether a course is major or cross depends on a student's selected concentration. The 9 concentrations are Columns 5 to 13 of the following table. Each student should follow the column corresponding to his/her selected concentration when deciding the major and cross courses to meet the minimum 15 major and cross unit requirements. For example, a student of D1T3 (Discipline 1 and Track 3) should follow the 7th column in the table.

In addition to the courses listed in the following table, upon the approval of advisor(group), other technical courses within TBSI and no more than 3 units of courses from other non-TBSI programs at Tsinghua Shenzhen International Graduate School (TSIGS) and Graduate School at Shenzhen, Tsinghua University may also meet certain unit requirements

Courses are grouped based on track. Notation: "M" means major course and "C" cross course.

	Course Title			**D1: Environmental science and new energy technology**			**D2: Data Science and Information Technology**			**D3: Precision medicine and healthcare**		
No.	**Track 1：**	**Course No.**	**Unit**	**D1T1**	**D1T2**	**D1T3**	**D2T1**	**D2T2**	**D2T3**	**D3T1**	**D3T2**	**D3T3**
1	Introduction of physics chemistry disciplines 物理化学学科介绍	86000681	1	M	C	C	M	C	C	M	C	C
2	Nano-energy Materials 纳米能源材料	86000012	2	M	C	C	M	C	C	M	C	C
3	Thermal Physics and Engineering 热物理学与工程	86000021	1	M	C	C	M	C	C	M	C	C
4	Dynamics of Environmental Systems: Principles of Mass Transformation and	86000032	2	M	C	C	C	C	C	C	C	C

	Energy Flow 环境系统与过程原理											
5	Sustainable Development: Ethics, Physics and Technology 可持续发展：伦理，机理和应用技术	86000241	1	M	M	M	M	C	C	M	C	C
6	Chaos and Complexity – System Dynamics Approach 混沌和复杂性--系统动力学方法	86000651	1	M	M	M	M	M	C	M	M	C
7	Computational Materials and Materials Genome Initiative 计算材料学与材料基因组工程	86000373	3	M	C	C	M	C	C	M	C	C
8	Materials Physics 材料物理	86000433	3	M	C	C	M	C	C	M	C	C
9	Materials Chemistry 材料化学	86000383	3	M	C	C	M	C	C	M	C	C
10	Principle of Environmental Behavior 环境行为学原理	86000312	2	M	C	C	C	C	C	C	C	C
11	Advanced Materials Characterization: Principles and New Developments 先进材料表征：原理和最新进展	86000423	3	M	C	C	M	C	C	M	C	C
12	Materials and Devices of Energy Storage and Conversion 能源储存与转化：材料和器件	86000411	1	M	C	C	M	C	C	M	C	C
13	MEMS and Its Application MEMS 及其应用	86000103	3	M	M	M	M	M	M	M	C	C

14	Materials Science and Engineering 材料科学与工程	86000663	3	M	C	C	M	C	C	M	C	C
15	Micro Sensors 微传感器	86000122	2	M	M	M	M	M	M	M	C	C
16	Introduction of Photonics 光电子概论	86000523	3	M	C	C	M	C	C	M	C	C
17	Nanomaterials and Nanotechnology 纳米材料与技术	86000533	3	M	C	C	M	C	C	M	C	C
18	Optical Fiber Communications 光纤通信	86000573	3	M	C	C	M	C	C	M	C	C
19	Nanoscale Fabrication and Optoelectronic Devices 纳米加工和光电子器件导论	86000322	2	M	C	C	M	C	C	M	C	C
20	Semiconductor Physics and Devices 半导体物理与器件	86000733	3	M	C	C	M	C	C	M	C	C
21	Sustainable Nanotechnology: Environmental Applications and Implications 可持续纳米技术：环境应用及其影响	86000783	3	M	C	C	M	C	C	M	C	C
22	Introduction to Statistical Mechanics and Molecular Simulation 统计力学与分子模拟简介	86000843	3	M	C	C	M	C	C	M	C	C
23	Partial Differential Equations for Practical Applications in Engineering 数理方程在工程科学中的实践应用	86000773	3	M	C	C	M	C	C	M	C	C

24	Opto-electronic Materials & Devices 光电子材料与器件		2	M	C	C	M	C	C	M	C	C
	Track 2：			**D1T1**	**D1T2**	**D1T3**	**D2T1**	**D2T2**	**D2T3**	**D3T1**	**D3T2**	**D3T3**
25	Energy-Environment and Data-Information 100 level course 能源环境与数据信息概论	86000691	1	C	M	C	C	M	C	C	M	C
26	Fundamentals of Applied Information Theory 应用信息论基础	86000132	2	C	M	C	M	M	M	C	M	C
27	Introduction of Smart Grid 智能电网导论	86000042	2	M	M	M	M	M	M	C	M	C
28	Supply Chain Design and Management 供应链设计与管理	86000054	4	C	M	C	M	M	M	C	C	C
29	Computational Photography 计算摄像学	86000603	3	C	C	C	M	M	M	C	C	C
30	Introduction to Probability Theory 概率论	76000073	3	C	M	C	M	M	M	C	M	C
31	Optimization Methods for Power Systems 电力系统优化方法论	86000451	1	C	M	M	C	M	C	C	C	C
32	Markov Chains: Theory and Applications 马尔科夫链：理论与应用	86000471	1	C	M	C	C	M	C	C	M	C
33	Discrete-Event Simulation 离散事件系统仿真	86000493	3	C	M	C	M	M	M	C	M	C

34	Inference and Information 信息推论	86000513	3	C	M	C	C	M	C	C	C	C
35	Learning from Data 数据学习	86000503	3	M	M	M	M	M	M	M	M	M
36	Distributed Control and Optimization of Power Systems 电力系统分布式控制与优化	86000583	3	C	M	C	M	M	M	M	M	C
37	Mathematical Statistics and Application in R 数理统计与 R 语言应用	86000563	3	M	M	M	M	M	M	C	M	C
38	Seminar in Data Science and Information Technology 数据科学与信息技术讨论课	86000362	2	C	M	C	M	M	M	C	M	C
39	Fundamentals of Digital Image and Video Processing 数字图像与视频处理	86000633	3	C	M	C	M	M	M	C	M	C
40	Operations Research 运筹学	76000093	3	C	M	C	M	M	M	C	C	C
41	Estimation and Control of Dynamical Systems 动力系统的评价与控制	86000643	3	C	M	C	C	M	C	C	M	C
42	Advanced Managerial Economics 高级管理经济学	86000072	2	C	M	C	C	M	C	C	M	C
43	ITS and High-accuracy Positioning Technologies 智能交通高精度定位	86000062	2	C	M	C	C	M	C	C	M	C
44	Mobile and Pervasive Computing 移动设备和普适计算	86000111	1	C	M	C	C	M	C	C	M	C

45	Analysis and Optimization on Logistics System 物流系统分析及优化	86000292	2	C	M	C	C	M	C	C	M	C
46	Introduction to Advanced ITS 现代智能交通系统导论	86000442	2	C	M	C	C	M	C	C	M	C
47	Traffic Modeling and Simulation 交通建模与仿真	86000402	2	C	M	C	C	M	C	C	M	C
48	Resilience-based Engineering of Smart Infrastructure Systems 基于弹性工程学的智慧建筑系统	86000711	1	C	M	C	M	M	M	C	M	C
49	Introduction to Nonlinear Optimization 非线性优化概述	86000461	1	C	M	C	M	M	M	C	M	C
50	Introduction to Quantitative Investment 量化投资概论	76000082	2	C	M	C	C	M	C	C	M	C
51	Optimization Theory and Machine Learning 优化理论和机器学习	86000611	1	C	M	C	M	M	M	C	M	C
52	Compressive Sensing with Sparse Models:Theory, Algorithms, and Applications 压缩感知与稀疏模型：理论、算法与应用	86000621	1	C	M	C	M	M	M	C	M	C
53	Power Systems and Market Operations 电力系统与市场运行	86000763	3	C	M	C	C	C	C	C	C	C
54	Computational Methods for Electric Power Systems 电力系统计算方法	86000722	2	C	C	C	C	M	C	C	C	C

55	System Miscellanies 系统杂论	86000742	2	C	C	C	C	M	C	C	C	C
56	Quantitative Method for Business and Policy Analysis 商业和政策分析的定量方法	86000753	3	C	M	C	C	M	C	C	M	C
57	大数据机器学习 Big Data Machine Learning	70240403	3	C	C	C	M	M	M	C	C	C
58	计算机视觉 Computer Vision	70240083	3	C	C	C	M	M	M	C	M	C
59	Large Network Steady-State Analysis 大型网络稳态分析方法	86000803	3	C	M	C	C	C	C	C	C	C
60	Information Theory and Statistical Learning 信息论与统计学习	86000793	3	C	M	C	C	M	C	C	M	C
61	SPECIAL ISSUES IN SEMICONDUCTOR OPTO-ELECTRONIC DEVICE MANUF 半导体光电器件制造中的特殊问题	86000822	2	M	C	C	M	C	C	M	C	C
62	Reinforcement Learning for Energy Systems 能源系统的强化学习	86000811	1	C	M	C	C	M	C	C	M	C
63	Machine learning, with application to medical and financial data 机器学习及其在医疗和金融数据上的应用		1	C	C	C	C	M	C	C	C	C
	Track 3：			**D1T1**	**D1T2**	**D1T3**	**D2T1**	**D2T2**	**D2T3**	**D3T1**	**D3T2**	**D3T3**
64	Design of Precision Medicine Platforms for Disease Diagnosis and Therapeutics	86000701	1	C	C	M	C	C	M	M	M	M

	精准医疗平台的设计及其疾病诊断和治疗应用											
65	Translational Research(C)转化研究（C）	86000221	1	C	C	M	C	C	M	C	C	M
66	Introduction to Mechanobiology 机械生物学介绍	86000542	2	C	C	M	C	C	C	M	M	M
67	Technology Advances for Regenerative Medicine 再生医学技术进展	86000553	3	C	C	M	C	C	C	M	M	M
68	Biophotonics for Engineers 生物光子学方法与实践	86000333	3	M	C	M	M	C	C	M	M	M
69	Introduction to Computer-Aided Tissue Engineering 计算机辅助组织工程	86000202	2	C	C	M	C	C	M	M	M	M
70	Translational Research (B)转化研究（B）	86000211	1	C	C	M	C	C	M	M	M	M
71	Introduction to Advanced Medical Device Design and Fabrication 高端医疗器械设计及制造概论	86000341	1	C	C	M	C	C	M	M	M	M
72	Soft Material Module 1: Biological Soft Materials 软质材料模块 1：生物软质材料	86000261	1	C	C	M	C	C	M	M	M	M
73	Soft Material Module 2: Synthetic and Hybrid Soft Materials 软质材料模块 2: 合成、混合软材料	86000271	1	C	C	M	C	C	M	M	M	M

74	Soft Material Module 3: Fabrication of Biomaterials 软质材料模块 3：生物材料制造工程	86000281	1	C	C	M	C	C	M	M	M	M
75	Vision and Imaging Science 视觉及影像科学	86000351	1	C	C	M	C	C	M	M	M	M
76	Current Topics in Cancer Biology 癌症生物学的研究现状	86000673	3	C	C	M	C	C	M	M	M	M
77	fMRI physics and practical data analysis 磁共振成像物理原理与数据分析	86000833	3	C	C	M	C	C	M	M	M	M