

BNU-HKBU

UNITED INTERNATIONAL COLLEGE

UNDERGRADUATE HANDBOOK

2008

Division of Science and Technology

Computer Science and Technology Programme

Contents

1. Introduction	255
2. The Division of Science and Technology.....	255
2.1 Admission	255
2.1.1 Mainland China Applicants.....	255
2.1.2 Hong Kong and Macau Applicants	256
2.1.3 Overseas Applicants.....	256
2.1.4 Disabled Applicants	256
3. The Computer Science and Technology Programme	257
3.1 Planned Student Intake.....	257
3.2 Teaching and Medium of Instruction	257
3.3 Programme Aims, Objectives and Learning Outcomes.....	257
4. Teaching Staff.....	258
5. Programme Structure.....	258
5.1 Major Core Subjects.....	259
5.2 Major Elective Subjects	260
5.2.1 Digital Media Communication Technology	261
5.2.2 Web Intelligence Technology	261
5.3 General Education Required Subjects.....	262
5.4 General Education Elective Subjects.....	262
6. Four-Year Study Plan	264
6.1 Year One.....	264
6.2 Year Two	264
6.3 Year Three	265
6.4 Year Four.....	265
7. Assessment, Progression and Awards.....	266
7.1 Assessment Methods	266
7.2 Assessment Grading System	266
7.3 Progression.....	266

7.3.1	Normal Progression.....	266
7.3.2	Students with Low GPA	267
7.3.3	Honours Classification	267
7.4	Academic Awards and Scholarships.....	267
8.	Subject Descriptions.....	268
8.1	Major Core Subjects.....	268
8.2	Major Elective Subjects	271
8.3	General Education Required Subjects.....	274
8.4	General Education Elective Subjects.....	274
9.	Internship, Placement and Overseas Visits.....	274
10.	Research Institute	275

1. Introduction

This student handbook provides some general information about the **Computer Science and Technology Programme** in the Division of Science and Technology, BNU-HKBU United International College. Students can also find specific information about the programme structure, degree requirements, grading scheme, curriculum, etc. in this handbook. Students should read this handbook carefully and talk to their mentor, teacher, Programme Coordinator, or the Division Dean if they have any queries. The content of this handbook is for reference only, and is subject to change without prior notice.

2. The Division of Science and Technology

The primary academic objective of the Division is to provide students with a number of four-year Honours Degree Programmes. Four major programmes are currently offered:

Programme	Degree^①	Years of Study
Computer Science and Technology 计算机科学与技术	B.Sc.(Honours) ⁽ⁱ⁾ 理学士(荣誉)	4
Statistics 统计学	B.Sc.(Honours) ⁽ⁱⁱ⁾ 理学士(荣誉)	4
Environmental Science 环境科学	B.Sc.(Honours) ⁽ⁱⁱⁱ⁾ 理学士(荣誉)	4
Food Science and Technology 食品科学与工程（营养科学方向）	B.Sc.(Honours) ^(iv) 理学士(荣誉)	4

2.1 Admission

Equal opportunities: UIC seeks to admit students of high academic ability and potential. All selection for admission takes place irrespective of gender. UIC selects students for admission without regard to race, ethnic origins, colour, religion or social background, and no candidate for admission will be treated less favourably than another on these grounds. Decisions on admission are based solely on the individual merits of each candidate and the application of selection criteria appropriate to the programme of study. Admission procedures will be kept under review to ensure compliance with this policy.

2.1.1 Mainland China Applicants

Mainland China students who have sat the P.R.C. College Entrance Examination of the current

^① The degree will be awarded by the Hong Kong Baptist University: (i) Bachelor of Science (Honours) in Computer Science and Technology 计算机科学与技术理学士(荣誉); (ii) Bachelor of Science (Honours) in Statistics 统计学理学士(荣誉); (iii) Bachelor of Science (Honours) in Environmental Science 环境科学理学士(荣誉); (iv) Bachelor of Science (Honours) in Food Science and Technology 食品科学与工程理学士 (荣誉).

year and have met the college entrance requirements are eligible to apply.

2.1.2 Hong Kong and Macau Applicants

An applicant from Hong Kong or Macau must **EITHER** —

(1) have obtained Grade E or above in at least 6 subjects ^{②③} in Hong Kong Certificate of Education Examination including Chinese Language^④ or an alternative language (other than Chinese and English) and English Language (Syllabus B)^⑤ with at least 5 subjects in a single sitting, and have satisfactorily completed Form 6 in Hong Kong;

OR-

(2) have graduated Form 6 from a Macau secondary school;

OR-

(3) have obtained an Associate Degree or Higher Diploma/Diploma of a higher education institution recognised by the College;

OR-

(4) have obtained an acceptable equivalent qualification.

Preference will be given to candidates who possess Hong Kong Advanced Level Examinations results.

2.1.3 Overseas Applicants

An applicant from overseas other than Hong Kong or Macau may apply for admission with qualification acceptable to the College, and will be considered on an individual basis.

2.1.4 Disabled Applicants

The UIC considers applications from students with a disability on an equal basis with other students. There are certain programmes of study with inherent requirements that militate against students with particular physical limitations seeking admission. Applicants with a disability are requested to indicate the nature of their disability on the application forms. It will not affect the chance of their admission, provided that the programmes applied for are those the applicants are physically able to cope with.

^② Five subjects are acceptable if the total of these 5 grades is not less than 8 points (Grade A to E shall be given points 5 to 1 respectively)

^③ Among the 6 subjects, at least one subject must be C or above.

^④ From 2007 onwards, Level II in HKCEE Chinese Language is considered equivalent to a pass (Grade E) in the subject.

^⑤ Grade C in English Language (Syllabus A) is considered equivalent to Grade E in English Language (Syllabus B). From 2007 onwards, Level II in HKCEE English Language is considered equivalent to a pass (Grade E) in the subject.

3. The Computer Science and Technology Programme

The Computer Science and Technology Programme at UIC is committed to quality, leading-edge education, and research. It offers the Bachelor of Science (Honours) in Computer Science and Technology.

3.1 Planned Student Intake

The planned student intake for Year 1 is about 60 students per year, and for Year 3 (for Associate Degree graduates or other qualified students), about 30 students per year.

3.2 Teaching and Medium of Instruction

Teaching will be mainly by formal lectures. Tutorials and laboratory sessions will also be organized to complement formal lectures. The most up-to-date IT tools will be used to aid teaching and learning. English is the medium of instruction for lectures, tutorials and laboratory classes.

3.3 Programme Aims, Objectives and Learning Outcomes

The general aim of the Bachelor of Science (Honours) in the Computer Science and Technology Degree Programme is to prepare students for a career in computer science or information technology related areas. Students will be equipped to work in industry, business, etc., or to pursue postgraduate study in China or abroad. Graduates will have developed learning skills and have the confidence to meet the challenges in the rapidly changing world of information technology.

In addition to the College-wide Whole Person Education, the specific objectives of the programme are to equip students with:

- (1) A solid and broad foundation in computer science;
- (2) An in-depth knowledge in selected computer technology areas;
- (3) Good problem solving skills; and
- (4) Good communication and interpersonal skills.

In order to achieve the above objectives, the computer science and technology curriculum has been carefully designed based on the internationally recognized IEEE/ACM computer science curriculum recommendations. Upon completion of this programme, students will have acquired:

- (1) the fundamental knowledge, and the learning capability for sustainable self-development in computer science as well as further study in related fields;
- (2) the technical knowledge to analyze, design, and develop computing systems;

- (3) advanced knowledge in one of two selected areas of computer technology, namely digital media communication technology or web intelligence technology;
- (4) the sense and creativity to identify real world problems and transform them into IT requirements;
- (5) the problem solving capability, communication techniques and presentation skills such that they are well equipped for their IT career.

4. Teaching Staff

Full-time teaching staff are recruited from all over the world. All teachers recruited must possess a Ph.D. and have relevant research experience. Experts or specialists in the field of computer science and technology, with exceptional skills and experience, are also recruited. Presently, the Dean of Science and Technology is Professor S.Y. Zee, B.Sc.(Honours), Ph.D. and the Programme Coordinator is Dr. Haipeng Guo, B.Sc.(Honours), Ph.D.

5. Programme Structure

The Computer Science and Technology B.Sc.(Honours) Degree is a four-year, full time degree programme, with considerable departure from traditional single discipline programmes. In addition to the subjects of the main discipline, students are required to take supporting, interdisciplinary and general education subjects of their own choice. In final year of study, students undertake individual projects, in which they can gain in-depth knowledge, develop basic research techniques, and experience during the course of thesis writing.

Students are normally expected to complete 132 to 135 subject credits within the curriculum structure below:

Subjects (科目)	Credits (学分)
Major Core Subjects (专业必修课)	45-48
Major Elective Subjects (专业选修课)	27-30
General Education Required Subjects (通识教育必修课)	36
General Education Elective Subjects (通识教育选修课)	15-33
Total (合计)	132-135

The subjects available each year are subject to minor changes and adjustments depending on staff availability.

5.1 Major Core Subjects

Subject	Chinese Title	Code	Credits
Computer Organization	计算机组织	COMP1010	3
Data Structures and Algorithms	数据结构和算法	COMP2010	3
Object-Oriented Programming	面向对象编程	COMP2020	3
Software Development Workshop I	软件开发工作坊 I	COMP2030	1
Data Communications and Networking	数据通讯和网络	COMP3020	3
Database Management Systems	数据库管理系统	COMP3030	3
Design and Analysis of Algorithms	算法设计和分析	COMP3040	3
Human Computer Interface	人机接口	COMP3050	3
Operating Systems	操作系统	COMP3060	3
Software Development Workshop II	软件开发工作坊 II	COMP3070	1
Software Development Workshop III	软件开发工作坊 III	COMP3080	1
Software Engineering	软件工程	COMP3090	3
Information Technology Professional Practices	信息技术职业实践	COMP4150	3
Final Year Project I	毕业论文 I	COMP4221	3
Final Year Project II [®]	毕业论文 II	COMP4222	3
Linear Algebra	线性代数	MATH1040	3
Discrete Structures	离散结构	MATH2020	3
Total	合计	---	45

[®] With the approval of the Programme Coordinator, students may replace it with a 3-credit major elective subject (经学科课程统筹主任批准, 学生可选修另一门 3 学分专业选修科目替代).

5.2 Major Elective Subjects

Subject	Chinese Title	Code	Credits
Principle of Programming Language	编程语言原理	COMP3100	3
Theory of Computation	计算理论	COMP4010	3
Advanced Topics in Software Engineering	软件工程高级讨论	COMP4020	3
Advanced Topics in Networking and Digital Media	网络和数字式媒体高级讨论	COMP4030	3
Advanced Topics in Theoretical Computer Science	计算机科学理论高级讨论	COMP4040	3
Computer and Network Security	计算机和网络安全	COMP4050	3
Computer Architectures	计算机结构	COMP4060	3
Computer Graphics	计算机图形	COMP4070	3
Data Mining and Knowledge Discovery	数据挖掘与知识发现	COMP4090	3
Database System Implementation	数据库系统开发	COMP4100	3
Digital Media Communications	数字媒体通信	COMP4110	3
Digital Media Computing	数字媒体计算	COMP4120	3
Distributed Computing Systems	分布式计算系统	COMP4130	3
E-technology Architectures, Tools and Applications	E-技术结构、工具和应用	COMP4140	3
Intelligent Systems	智能系统	COMP4160	3
Internet and the World Wide Web	互联网及万维网	COMP4170	3
Introduction to Web Intelligence	万维网智能简介	COMP4180	3
Artificial Intelligence and Machine Learning	人工智能和机器学习	COMP4190	3
Computer Vision and Pattern Recognition	计算机视觉和模式识别	COMP4200	3
Information Retrieval and Search Engine	信息获取及搜索引擎	COMP4210	3

Out of the major electives, students are required to select at least 5 subjects from one of the following streams: Digital Media Communication Technology (数字媒体通信技术) or Web Intelligence Technology (万维网智能技术).

5.2.1 Digital Media Communication Technology

Subject	Chinese Title	Code	Credits
Advanced Topics in Networking and Digital Media	网络和数字式媒体高级讨论	COMP4030	3
Computer and Network Security	计算机和网络安全	COMP4050	3
Computer Graphics	计算机图形	COMP4070	3
Database System Implementation	数据库系统开发	COMP4100	3
Digital Media Communications	数字媒体通信	COMP4110	3
Digital Media Computing	数字媒体计算	COMP4120	3
Distributed Computing Systems	分布式计算系统	COMP4130	3
Internet and the World Wide Web	互联网及万维网	COMP4170	3

5.2.2 Web Intelligence Technology

Subject	Chinese Title	Code	Credits
Computer and Network Security	计算机和网络安全	COMP4050	3
Data Mining and Knowledge Discovery	数据挖掘与知识发现	COMP4090	3
Database System Implementation	数据库系统开发	COMP4100	3
Digital Media Computing	数字媒体计算	COMP4120	3
E-tech. Architectures, Tools, Applications	E-技术结构、工具和应用	COMP4140	3
Intelligent Systems	智能系统	COMP4160	3
Internet and the World Wide Web	互联网及万维网	COMP4170	3
Introduction to Web Intelligence	万维网智能简介	COMP4180	3
Information Retrieval and Search Engine	信息获取及搜索引擎	COMP4210	3

5.3 General Education Required Subjects^⑦

Subject	Chinese Title	Code	Credits
Structured Programming ^⑧	结构化编程	COMP1020	3
English I	大学英语 I	ENG1011	3
English II	大学英语 II	ENG1012	3
Academic Reading and Writing	学术阅读与写作	ENG1020	3
English III	大学英语 III	ENG2011	3
English IV	大学英语 IV	ENG2012	3
Chinese I	大学中文 I	LANG1011	3
Chinese II	大学中文 II	LANG1012	3
Mathematics for Science	高等数学(理工学生修读)	MATH1030	3
Physical Education/Healthy Living	体育和保健	P.E.1010	3
Applied Ethics	应用伦理学	R.P.2010	3
Statistics for Science	实用统计学(理工学生修读)	STAT1030	3
Total	合计	---	36

5.4 General Education Elective Subjects^⑦

Subject	Chinese Title	Code	Credits
World Ecological Problems and Man	世界生态与人类	BIOL 1010	3
Global Business Environment	全球商业环境	BUS 4060	3
Contemporary Chinese Popular Culture	中国当代流行文化	CHI 4020	3
Web application and development	万维网应用与发展	COMP 3110	3
Re-viewing the Museum	博物馆回顾与前瞻	CTHM 4040	3
Culture and Food	文化与饮食	CTHM 4050	3
Voices without Borders	诗歌无疆界	CW4010	3
An Introduction to Geographic Information Systems	地理信息系统导论	DGC 4010	3
Introduction to Food Science	食品科学概论	FOOD 2010	3
Understanding American Character	美国人格透视	HUM 4020	3
Sino-Western Cultural Interchange	中西文化交流	HUM4030	3
Japanese I	基础日语 I	LANG 4010	3
French I	法语 I	LANG 4030	3
Latin I	拉丁文 I	LANG 4120	3
Korean I	韩语 I	LANG 4040	3
Spanish I	西班牙语 I	LANG 4070	3

^⑦ The availability of general education required subjects and general education elective subjects are subject to change, see announcements posted on the UIC website.

^⑧ This subject has replaced Information Technology, which is a required subject for all other students (此科目用以替代其它学生必修之通识教育科目“信息科技”).

Music History: Film Music	音乐史：电影音乐	MUS 4040	3
European Music of the Baroque Period	巴洛克时期的欧洲音乐	MUS 4050	3
Leading and Communicating across Cultures	跨文化之领导与交流	ORGC 4010	3
Introduction to Psychology	心理学导论	PSY 4030 ^⑨	3
Management, Society and Life	管理、社会与人生	R.P.1010	3
Primitive Religion	原始宗教	REL 4010	3
Sociology of Health and Disease	健康与疾病社会学	SOC 4070	3
Corporate Financial Management and Society	企业财务管理与社会	SOC 4290	3
Design and Analysis of Surveys	问卷设计与分析	STAT 4030	3
Computer-aided Data Analysis	统计软件入门	STAT 4140	3
Introduction to Social Welfare	社会福利学导论	SWSA 1040	3
Introduction to the Study of Language	语言学习导论	TESL 1010	3
Other General Education Electives*	其它选修科目	---	---
Total	合计	---	15-33

* See UIC website.

^⑨ The previous code for Introduction to Psychology is SWSA 4140.

(Note: For the most updated study plan, please visit the study plan link next to the handbook link on the Academic Registry website. Click on "2006 Cohort", "2007 Cohort" or "2008 Cohort" specialized for your cohort).

※ *Handbook 2008* ※

6. Four-Year Study Plan

6.1 Year One

Semester 1 上学期	Credits 学分	Semester 2 下学期	Credits 学分
English I (ENG1011) 大学英语 I	3	English II (ENG1012) 大学英语 II	3
Chinese I (LANG1011) 大学中文 I	3	Chinese II (LANG1012) 大学中文 II	3
Mathematics for Science (MATH1030) 高等数学(理工学生修读)	3	Linear Algebra (MATH1040) 线性代数	3
Physical Education (P.E.1010) 体育和保健	3	Statistics for Science (STAT1030) 实用统计学(理工学生修读)	3
Structured Programming (COMP1020) 结构化编程	3	Computer Organization (COMP1010) 计算机组织	3
General Education Electives 通识教育选修科目	3	Academic Reading and Writing (ENG 1020) 学术阅读与写作	3
Total 合计	18	Total 合计	18

6.2 Year Two

Semester 1 上学期	Credits 学分	Semester 2 下学期	Credits 学分
English III (ENG2011) 大学英语 III	3	English IV (ENG2012) 大学英语 IV	3
Object-Oriented Programming (COMP2020) 面向对象编程	3	Data Structures and Algorithms (COMP2010) 数据结构和算法	3
Discrete Structures (MATH2020) 离散结构	3	Software Development Workshop I (COMP2030) 软件开发工作坊 I	1
Applied Ethics (R.P.2010) 应用伦理学	3	General Education Electives 通识教育选修科目	9
General Education Electives 通识教育选修科目	6	---	---
Total 合计	18	Total 合计	16

6.3 Year Three

Semester 1 上学期	Credits 学分	Semester 2 下学期	Credits 学分
Database Management Systems (COMP3030) 数据库管理系统	3	Human Computer Interface (COMP3050) 人机接口	3
Operating Systems (COMP3060) 操作系统	3	Software Engineering (COMP3090) 软件工程	3
Data Comm. And Networking (COMP3020) 数据通讯和网络	3	Software Development Workshop III (COMP3080) 软件开发工作坊 III	1
Design & Analysis of Algorithms (COMP3040) 算法设计和分析	3	Major Electives 专业选修科目	6
Software Development Workshop II (COMP3070) 软件开发工作坊 II	1	General Education Electives 通识教育选修科目	3
General Education Electives 通识教育选修科目	3	---	---
Total 合计	16	Total 合计	16

6.4 Year Four

Semester 1 上学期	Credits 学分	Semester 2 下学期	Credits 学分
Final Year Project I (COMP4221) 毕业论文 I	3	Final Year Project II (COMP4222) [®] 毕业论文 II	3
Major Electives 专业选修科目	12	IT Professional Practice (COMP4150) 信息技术职业实践	3
---	---	Major Electives 专业选修科目	9
Total 合计	15	Total 合计	15

[Note: Some of the subjects offered in Year Four, second semester may be taught in an earlier semester. The subjects available each year are subject to changes and adjustments depending on staff availability. Students are expected to check with the Academic Registry for subjects available in any one particular year.]

[®] With the approval of the Programme Coordinator, students may replace this with a 3-credit major elective subject (经学科课程统筹主任批准, 学生可选修另一门 3 学分的专业选修科目替代).

7. Assessment, Progression and Awards

This programme follows basically the HKBU undergraduate course regulations approved by the UIC Senate (See Appendix II) in terms of assessment, progression and awards. An extract (with modifications) is given below:

7.1 Assessment Methods

The assessment guidelines for each subject are specified in the syllabus of the subject. The subject instructors will determine and announce the specific assessment procedures for their subjects. Each final year project will be assessed by: (i) the supervisor; and (ii) another examiner.

7.2 Assessment Grading System

The programme will follow the Grade Point Average (GPA) system. Letter grades are given for each subject. The following table shows the grade points earned corresponding to the letter grade.

Letter Grade	Academic Performance	Grade Point Per Unit
A	Excellent	4.00
A-	Excellent	3.70
B+	Good	3.30
B	Good	3.00
B-	Good	2.70
C+	Satisfactory	2.30
C	Satisfactory	2.00
C-	Satisfactory	1.70
D	Marginal Pass	1.00
E	Conditional Pass	0.00
F	Fail	0.00
I	Incomplete	NA
S	Satisfactory	NA
U	Unsatisfactory	NA
W	Withdrawn	NA
YR	Year Grade	NA
NR	Not Yet Reported	NA
PR	Project to be Resubmitted	NA

7.3 Progression

7.3.1 Normal Progression

The overall performance of students will be presented to the Division Board of Science & Technology and/or the Board of Examiners at the end of each academic year for evaluation.

The criterion for normal progression from one year of the programme to the next is to achieve a Year GPA of not lower than 2.00.

7.3.2 Students with Low GPA

Students with a year GPA below 1.70 will be warned officially and/or put on academic probation. Students with an extremely low GPA may, at the discretion of the Board of Examiners, be required to repeat the year of study. Those who fail to meet the academic requirements in the repeat year may be dismissed from the Programme.

7.3.3 Honours Classification

The B.Sc. (Honours) in Computer Science and Technology will only be awarded to students who successfully complete all the progression requirements of the four-year programme set out by the College. The various classifications are based on the cumulative Grade Point Average (cGPA). The general guidelines are as follows:

cGPA	Honours Classification
3.40-4.00	First Class
3.00-3.39	Second Class (Division I)
2.50-2.99	Second Class (Division II)
2.20-2.49	Third Class
2.00-2.19	Pass

7.4 Academic Awards and Scholarships

President's Honour Roll

The President's Honour Roll is applicable to students with a GPA of 3.50 or above, and with no grades below C for a given semester.

Dean's List

The Dean's List is applicable to students with a semester GPA between 3.00 and 3.49 and with no grades below C for a given semester.

Scholastic Award

The graduate who has the highest cumulative GPA (cGPA) in the graduating class, and whose cGPA is no less than 3.20, will be awarded the scholastic award for that year. In any one year, if more than one graduate in the same programme has the same highest cGPA, of 3.20 or above, they will all be given the scholastic award.

Scholarships

Scholarships are awarded to students based on academic merit (See the UIC website for details).

8. Subject Descriptions

8.1 Major Core Subjects

COMP1010 COMPUTER ORGANIZATION (3 credits)

Pre-requisite(s): None

Subject Description: An introduction to the building blocks and organization of modern digital computers. The course helps us to answer the question: How does a computer work? Topics include: historical development of computing and the von Neumann model; data representation in computer systems; boolean algebra, digital logic and its application to understanding Central Processing Unit (CPU) organization; assembly language programming; other basic modules, such as cache memory, virtual memory, and input/output techniques; and programming tools and the *Java Virtual Machine (JVM)*.

COMP2010 DATA STRUCTURES AND ALGORITHMS (3 credits)

Pre-requisite(s): COMP1020 STRUCTURED PROGRAMMING

Subject Description: This subject develops students' knowledge of data structures and their associated algorithms. It introduces the concepts and techniques of structuring and operating on Abstract Data Types in problem solving. Common sorting, searching and graph algorithms will be discussed, and their complexity studied.

COMP2020 OBJECT-ORIENTED PROGRAMMING (3 credits)

Pre-requisite(s): COMP1020 STRUCTURED PROGRAMMING

Subject Description: This subject introduces object-oriented programming concepts, principles, and techniques, including classes, objects, inheritance, and polymorphism. All these concepts are illustrated using a contemporary object-oriented programming language. Upon completion, students should be able to use an object-oriented language to develop complex programmes.

COMP2030 SOFTWARE DEVELOPMENT WORKSHOP I (1 credit)

Pre-requisite(s): None

Subject Description: This workshop introduces the basic concepts in network and server administration. Practical, hands-on experience of server administration will be emphasized.

COMP3020 DATA COMMUNICATIONS AND NETWORKING (3 credits)

Pre-requisite(s): COMP1010 COMPUTER ORGANIZATION

Subject Description: Students will learn the principles of data communications, computer networks and network programming. Topics include: Network hardware and software, Network topologies and categories, Reference models and standards, Physical layer: signal analysis, bandwidth and data rate, transmission media, encoding, transmission, Data link layer, Network layer, Ethernet, Fast Ethernet, Gigabit Ethernet, Wi-Fi, TCP/IP, Socket programming, Client and Server software.

COMP3030 DATABASE MANAGEMENT SYSTEMS (3 credits)

Pre-requisite(s): COMP1020 STRUCTURED PROGRAMMING

Subject Description: This subject introduces how to represent the data in a database for a given application and how to manage and use a database management system. Topics include: conceptual modeling of a database, relational data model, relational algebra, database language SQL, relation database design, and emerging XML data models. In addition, hands-on DBMS experience is included.

COMP3040 DESIGN AND ANALYSIS OF ALGORITHMS (3 credits)

Pre-requisite(s): MATH2020 DISCRETE STRUCTURES

COMP2010 DATA STRUCTURES AND ALGORITHMS

Subject Description: This subject builds on the study of the analysis and implementation of algorithms and data structures (COMP2010). The goal is to introduce a number of important algorithms that are interesting both from a practical and theoretical point of view. Algorithm design paradigms such as divide-and-conquer and dynamic programming will be discussed, and algorithms for sorting, searching, and graph problems, etc., will be developed.

COMP3050 HUMAN COMPUTER INTERFACE (3 credits)

Pre-requisite(s): COMP1020 STRUCTURED PROGRAMMING

COMP2010 DATA STRUCTURES AND ALGORITHMS

Subject Description: This subject introduces the fundamental principles of how to design usable interfaces to computational environments that interact with, and support human information processing.

COMP3060 OPERATING SYSTEMS (3 credits)

Pre-requisite(s): COMP1010 COMPUTER ORGANIZATION

Subject Description: Introduces the fundamentals of operating system design and implementation. Topics include an overview of the components of an operating system, mutual exclusion and synchronization, deadlocks and starvation, implementation of processes and threads, resource scheduling algorithms, memory management, and file systems

COMP3070 SOFTWARE DEVELOPMENT WORKSHOP II (1 credit)

Co-requisite: COMP3020 DATA COMMUNICATION AND NETWORKING

Subject Description: This workshop introduces the latest multimedia software tools, and advanced network administration. Practical, hands-on experience of multimedia software tools and network administration will be emphasized.

COMP3080 SOFTWARE DEVELOPMENT WORKSHOP III (1 credit)

Pre-requisite(s): COMP1020 STRUCTURED PROGRAMMING

COMP3020 DATA COMMUNICATION AND NETWORKING

COMP3030 DATABASE MANAGEMENT SYSTEMS

Subject Description: This workshop introduces the state-of-the-art technologies in Web applications, and enhances practical, hands-on experience of Web programming.

COMP3090 SOFTWARE ENGINEERING (3 credits)

Pre-requisite(s): MATH2020 DISCRETE STRUCTURES

COMP2010 DATA STRUCTURES AND ALGORITHMS

Subject Description: This subject discusses the principles and practical aspects of software development. It studies the methodology of software development as well as the organization, planning and management of the development process so that students will appreciate the difficulties involved in a large system development project and the importance of a disciplined approach to the problem.

COMP4150 INFORMATION TECHNOLOGY PROFESSIONAL PRACTICES (3 credits)

Pre-requisite(s): YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: This subject examines important professional issues in contemporary practice to help the student become an effective participant in a team of IT professionals.

COMP4221 FINAL YEAR PROJECT I (3 credits)

COMP4222 FINAL YEAR PROJECT II^① (3 credits)

Pre-requisite(s): YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: Students will undertake an individual project under the supervision of a faculty member and gain the practical experience of applying computer systems principles and techniques acquired from the course to the solution of real-life problems. The project demands careful planning and creative application of underlying theories and enabling technologies. A thesis and an oral presentation are required upon successful completion of the project. This subject is open to Computer Science majors only.

MATH 1040 LINEAR ALGEBRA (3 credits)

Pre-requisite(s): MATH1030 MATHS FOR SCIENCE

Subject Description: This subject introduces the basic techniques in matrix algebra, which is the foundation for more advanced mathematics and statistics subjects. Major emphasis will be on the system of linear equations, linear in-dependence, and eigenvalue problems in finite dimensional vector spaces. Basic ideas and techniques of calculus will be introduced.

MATH2020 DISCRETE STRUCTURES (3 credits)

Pre-requisite(s): None

Subject Description: This subject addresses a variety of fundamental topics in computer science, including propositional and predicate logic, proof technique, set theory, combinatorics, graph theory, and Boolean algebra.

^①With the approval of the Programme Coordinator, students may replace this with a 3-credit major elective subject (经学科课程统筹主任批准, 学生可选修 3 学分的毕业论文及另一门 3 学分的专业选修科目).

8.2 Major Elective Subjects

COMP3100 PRINCIPLE OF PROGRAMMING LANGUAGE (3 credits)

Pre-requisite(s): COMP2020 OBJECT-ORIENTED PROGRAMMING

Subject Description: This subject introduces the concepts that underline most of the programming languages students are likely to encounter, and illustrates those concepts with examples from various languages. Topics include syntax and semantic analysis, bindings, type systems, programming paradigms, control abstraction and flow.

COMP4010 THEORY OF COMPUTATION (3 credits)

Pre-requisite(s): MATH2020 DISCRETE STRUCTURES

Subject Description: This course aims to introduce the fundamental concepts in theoretical computer science. The topics include deterministic and non-deterministic finite automata, regular languages, context-free languages, Turing machines, Church's thesis, the halting problem, computability, and complexity. Also, the formal relationships between machines, languages and grammars are addressed.

COMP4020 ADVANCED TOPICS IN SOFTWARE ENGINEERING (3 credits)

Pre-requisite(s): COMP3090 SOFTWARE ENGINEERING

Subject Description: This elective subject further develops students' knowledge in software engineering, and discusses state-of-the-art techniques and research topics in the field.

COMP4030 ADVANCED TOPICS IN NETWORKING AND DIGITAL MEDIA (3 credits)

Pre-requisite(s): The Pre-requisites depend on the specific topics covered. The Pre-requisites and the chosen topics will be announced before the semester begins.

Subject Description: Students will study some state-of-the-art topics in networking and digital media.

COMP4040 ADVANCED TOPICS IN THEORETICAL COMPUTER SCIENCE (3 credits)

Pre-requisite(s): YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: This subject provides an in-depth study of a selected topic of theoretical computer science. The topic to be covered may vary from semester to semester, and is determined by the instructor. The topic could be a specific area of algorithmic problems (e.g., graph algorithms, combinatorial optimization, etc.), or a particular algorithm design paradigm (e.g., randomized algorithms, parallel algorithms, etc.).

COMP4050 COMPUTER AND NETWORK SECURITY (3 credits)

Pre-requisite(s): COMP1020 STRUCTURED PROGRAMMING
COMP3020 DATA COMMUNICATION AND NETWORKING
YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: This subject introduces the fundamental concepts and techniques in

computer and network security. Topics include basic encryption techniques, cryptographic algorithms, authentication and digital signature, public key infrastructure, access control, security models, as well as their applications to, for example, IP security, Web security, and trusted operating systems. In addition, it discusses other system and programming related security issues, including non-malicious errors, computer viruses, and intrusion detection.

COMP4060 COMPUTER ARCHITECTURES (3 credits)

Pre-requisite(s): MATH2020 DISCRETE STRUCTURES

COMP2010 DATA STRUCTURE AND ALGORITHMS

Subject Description: This subject provides students with the ideas and concepts required to understand the architectures of modern microprocessors, including instruction set principles, pipelining, instruction-level parallelism, memory hierarchy design, I/O, and internetworking. It also equips students with the analytical tools for assessing processor performance.

COMP4070 COMPUTER GRAPHICS (3 credits)

Pre-requisite(s): COMP2010 DATA STRUCTURE AND ALGORITHMS

MATH1040 LINEAR ALGEBRA

Subject Description: To learn the principles of digital media communication and study some applications and current topics.

COMP4090 DATA MINING AND KNOWLEDGE DISCOVERY (3 credits)

Pre-requisite(s): STAT1030 STATISTICS FOR SCIENCE

COMP2010 DATA STRUCTURES AND ALGORITHMS

COMP3030 DATABASE MANAGEMENT SYSTEMS

Subject Description: This subject provides an overview of the concepts and techniques in knowledge discovery and data mining. Potential application areas include business, finance, medicine, and education.

COMP4100 DATABASE SYSTEM IMPLEMENTATION (3 credits)

Pre-requisite(s): COMP2010 DATA STRUCTURES AND ALGORITHMS

COMP3030 DATABASE MANAGEMENT SYSTEMS

Subject Description: This subject provides students with an in-depth knowledge of relational database management systems (DBMS). Topics include data storage, index structures, query evaluation, transaction processing, concurrency control, and crash recovery. In addition, advanced topics such as distributed databases and data warehouses will also be covered.

COMP4110 DIGITAL MEDIA COMMUNICATIONS (3 credits)

Pre-requisite(s): COMP4120 DIGITAL MEDIA COMPUTING

Subject Description: Students will learn the principles of digital media communication, and study some applications and current topics.

COMP4120 DIGITAL MEDIA COMPUTING (3 credits)

Pre-requisite(s): COMP2010 DATA STRUCTURES AND ALGORITHMS

MATH1040 LINEAR ALGEBRA

Subject Description: This subject introduces the basic properties of different types of digital media in the multimedia systems, namely audio, image, and video. As data compression is the most important enabling technology, making modern multimedia systems possible, data compression algorithms and the international standards of these digital media will be discussed.

COMP4130 DISTRIBUTED COMPUTING SYSTEMS (3 credits)

Pre-requisite(s): COMP3020 DATA COMMUNICATIONS AND NETWORKING

Subject Description: This course introduces the needs, key concepts, and techniques underlying the design and engineering of distributed computing systems. The discussions will focus on communications, synchronization and concurrency control, process management, distributed file services, and case studies. Also included will be an introduction to clustering computing and parallel algorithms.

COMP4140 E-TECHNOLOGY ARCHITECTURES, TOOLS AND APPLICATIONS (3 credits)

Pre-requisite(s): COMP 3020 DATA COMMUNICATIONS AND NETWORKING
YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: This subject develops students' knowledge in emerging e-technologies, including related architectures, tools, and applications. In particular, it introduces the Web from three different aspects: (1) Web as distributed databases; (2) Web as distributed computing platforms; and (3) Web as social networks. It discusses the use of e-technologies in different application domains, including e-business, e-learning, etc.

COMP4160 INTELLIGENT SYSTEMS (3 credits)

Pre-requisite(s): COMP 1020 STRUCTURED PROGRAMMING
YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: This subject aims at providing an overview of the state-of-the-art computational models and techniques for developing intelligent information systems, software solutions, and human-computer interfaces. Practical applications in the areas of Web Intelligence, Business Intelligence, and Personalized Assistance will be introduced. Related implementation issues will be discussed.

COMP4170 INTERNET AND THE WORLD WIDE WEB (3 credits)

Pre-requisite(s): COMP3020 DATA COMMUNICATIONS AND NETWORKING

Subject Description: Students will learn the principles of the Internet and the World Wide Web, and study some applications and current topics.

COMP4180 INTRODUCTION TO WEB INTELLIGENCE (3 credits)

Pre-requisite(s): COMP 1020 STRUCTURED PROGRAMMING
COMP 3020 COMMUNICATIONS AND NETWORKING
YEAR IV STANDING IN COMPUTER SCIENCE

Subject Description: This subject introduces the fundamental concepts and practical applications of contemporary Artificial Intelligence (e.g., incorporating knowledge discovery and data mining, intelligent agents, and social network intelligence) and advanced Information

Technology (e.g., involving wireless networks, ubiquitous devices, social networks, and data/knowledge grids) in the context of Web-empowered systems, environments, and activities. In addition, it discusses the techniques and issues central to the development of Web Intelligence (WI) computing systems.

COMP4190 ARTIFICIAL INTELLIGENCE AND MACHINE LEARNING (3 credits)

Pre-requisite(s): COMP 2010 DATA STRUCTURES AND ALGORITHMS

MATH 2020 DISCRETE STRUCTURES

STAT 1030 STATISTICS FOR SCIENCE

Subject Description: This subject presents the principles and fundamental techniques of artificial intelligence, particularly in the field of machine learning. Students not only learn the fundamentals and state-of-the-art techniques, but also acquire some practical insights into the current development of this field.

COMP4200 COMPUTER VISION AND PATTERN RECOGNITION (3 credits)

Pre-requisite(s): COMP 2010 DATA STRUCTURES AND ALGORITHMS

MATH 1030 MATHS FOR SCIENCE

Subject Description: This subject provides students with the knowledge and techniques used in contemporary research in computer vision and pattern recognition.

COMP4210 INFORMATION RETRIEVAL AND SEARCH ENGINE (3 credits)

Pre-requisite(s): STAT 1030 STATISTICS FOR SCIENCE

COMP 2010 DATA STRUCTURES AND ALGORITHMS

COMP 3030 DATA MANAGEMENT SYSTEM

Subject Description: This subject introduces the basic principles of information retrieval and search engines. Advanced models and techniques in information processing and retrieval will be covered.

8.3 General Education Required Subjects

See Appendix I.

8.4 General Education Elective Subjects

See Appendix I.

9. Internship, Placement and Overseas Visits

In order to provide students with practical experience and broaden their minds and horizons, UIC will try to arrange internships, placement in industries, companies and enterprises, and overseas visits for students (see the UIC website for details).

10. Research Institute

In 2006, the Division of Science and Technology established a Statistics and Computational Intelligence Research Institute (for details, see the UIC web-site). The Director of the Institute is Prof. K. T. Fang (IMS and ASA Elected Fellow).

