BASc in
Applied Artificial Intelligence

Syllabuses and Regulations

2019-2020

Faculty of Science
The University of Hong Kong
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Degree : Bachelor of Arts and Sciences in Applied Artificial Intelligence

Aim : The aim of this curriculum that spans across Architecture, Engineering, Science and Social Sciences is to recruit excellent students, equip them with theoretical foundations of artificial intelligence, as well as the necessary problem-solving (both qualitative and quantitative) and analytical skills, and nurture them to transfer interdisciplinary scientific knowledge into a wide range of integrated applications and technological innovations, generating in the process valuable practical experiences.

SECTION I  Aim and Learning Outcomes

By the end of this programme, students should be able to:

(1) apprehend the concepts of artificial intelligence and its underlying theory in relation to a broad range of related disciplinary areas (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(2) be proficient with artificial intelligence techniques, and offer effective recommendations for innovative initiatives and solutions (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(3) acquire the necessary critical thinking, creative problem solving and communication skills for effective work and collaboration (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(4) communicate to people effectively and efficiently with professionalism and accuracy (by means of coursework and tutorial classes and/or research-based project in the curriculum)

(5) gain insights into current advances and comprehensive knowledge of artificial intelligence to solve real-life problems (by means of coursework and tutorial classes and/or research-based project in the curriculum)
1. General guideline for contact hour requirement in the BASc(AppliedAI) Degree Curriculum

(a) A 6-credit course has around 120 total study hours, including contact hours, study time, assignment and assessment.
(b) About 30% of the total study hours are actual contact hours in the form of a class, e.g. lecture and tutorial/discussion hours.
(c) A 6-credit course has around 24-36 lecture hours.
(d) For lecture-based courses, normally there will be tutorial/discussion sessions.
(e) For courses employing a non-lecture or lab-based approach, e.g. IT-based or project-based courses, students are expected to devote about 120-180 hours for a 6-credit course, and 240-360 hours for a 12-credit course.

2. Credit Unit Statement of the BASc(AppliedAI) Degree Curriculum

The BASc(AppliedAI) degree curriculum consists of three major types of courses based on the learning activities. The majority of courses in the programmes are 6 credits. Examples of the contact hour requirements for the three categories of courses are described as follows.

(a) Lecture-based courses (6 credits)
Contact hours: 24-36 hours of lectures and/or tutorials for 6 credits
These courses are taught predominantly by lectures and tutorials. Assessment is by a combination of examination (0-75%) and continuous assessment (25-100%). Continuous assessment tasks include written assignments (totaling no more than 8,000 words) such as essays and project reports, and oral presentations. The requirement for a 3-credit lecture-based course will be about one-half of that of a 6-credit lecture-based course. Details of the assessment tasks can be found in the description of individual courses.

(b) Lecture with laboratory component courses (6 credits)
Contact hours for 30-36 hours of lectures and/or tutorial
These courses are taught by a combination of lectures and laboratory/practical sessions. Assessment is by a combination of examination (0-50%) and continuous assessment (50-100%). Continuous assessment tasks include coursework (totalling no more than 8,000 words) such as assignments, essays, laboratory reports, and project reports, and oral presentations. Details of the assessment tasks can be found in the description of individual courses.

(c) Project-based courses (6 and 12 credits)
These courses aim at providing students with an opportunity to pursue their own research interest under the supervision of a teacher. The teacher normally meets with the student weekly to discuss project progress. Assessment task is normally through research reports or a dissertation (totalling no more than 10,000 words for a 6-credit course and 20,000 words for a 12-credit course). Oral presentation will form part of the assessment. Details of the assessment tasks can be found in the description of individual courses.
### List of BASc(AppliedAI) Courses* on offer in 2019/2020 and 2020/2021^  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credit</th>
<th>Pre-requisite</th>
<th>Available in</th>
<th>Exam held in 2019-2020</th>
<th>Quota</th>
<th>Course Coordinator</th>
<th>Major / Minor</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAES1000</td>
<td>Core University English</td>
<td>6</td>
<td>NIL</td>
<td>Y</td>
<td>Y</td>
<td>1, 2 Dec, May</td>
<td>500</td>
<td>Dr P Wong, English</td>
</tr>
<tr>
<td>CAES9820</td>
<td>Academic English for science students</td>
<td>6</td>
<td>NIL</td>
<td>Y</td>
<td>Y</td>
<td>1, 2 No exam</td>
<td>---</td>
<td>Dr E Law, English</td>
</tr>
<tr>
<td>CAES9821</td>
<td>Professional and technical communication for mathematical sciences</td>
<td>6</td>
<td>NIL</td>
<td>Y</td>
<td>Y</td>
<td>1, 2 No exam</td>
<td>---</td>
<td>Dr E Law, English</td>
</tr>
<tr>
<td>CSCI9001</td>
<td>Practical Chinese for science students</td>
<td>6</td>
<td>NIL</td>
<td>Y</td>
<td>Y</td>
<td>1, 2 Dec, May</td>
<td>---</td>
<td>Mr K W Wong, Chinese</td>
</tr>
<tr>
<td>MATH1013</td>
<td>University mathematics II</td>
<td>6</td>
<td>Level 2 or above in Module 1, or Module 2 of HKDSE Mathematics or equivalent, or Pass in MATH1009 or MATH1011; and Not for students who have passed MATH1821, or (MATH1851 and MATH1853), or have already enrolled in this course.</td>
<td>Y</td>
<td>Y</td>
<td>1, 2 Dec, May</td>
<td>500</td>
<td>Dr C W Wong, Mathematics</td>
</tr>
<tr>
<td>MATH2014</td>
<td>Multivariable calculus and linear algebra</td>
<td>6</td>
<td>Pass in MATH1013 or (MATH1851 and MATH1853). Not for students who have passed MATH2822 or [MATH2101 or MATH2102 and MATH2211], or have already enrolled in these courses.</td>
<td>Y</td>
<td>Y</td>
<td>1, 2 Dec, May</td>
<td>---</td>
<td>Dr H Y Zhang, Mathematics</td>
</tr>
</tbody>
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* This list only includes courses offered by the Department of Statistics & Actuarial Science and the Department of Mathematics and language courses.  
^ Availability of courses in 2020-2021 is subject to change.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credit</th>
<th>Prerequisites</th>
<th>Offered</th>
<th>Instructor</th>
<th>Co-requisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>MATH3901</td>
<td>Numerical analysis</td>
<td>6</td>
<td>Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)</td>
<td>Y Y</td>
<td>1 Dec</td>
<td>--- Dr Z Zhang, Mathematics Minor in Computational &amp; Financial Mathematics (2019,2018,2017,2016,2015)</td>
</tr>
<tr>
<td>MATH3904</td>
<td>Introduction to optimization</td>
<td>6</td>
<td>Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)</td>
<td>Y Y</td>
<td>1 Dec</td>
<td>--- Prof W Zang, Mathematics Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019,2018,2017,2016,2015)</td>
</tr>
<tr>
<td>MATH3906</td>
<td>Financial calculus</td>
<td>6</td>
<td>Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822) or STAT2601</td>
<td>Y Y</td>
<td>1 Dec</td>
<td>--- Dr S P Yung, Mathematics Minor in Computational &amp; Financial Mathematics Bachelor of Arts and Sciences in Applied Artificial Intelligence</td>
</tr>
<tr>
<td></td>
<td>Financial calculus</td>
<td>6</td>
<td>Pass in MATH2101 and MATH2211 or MATH2014 or (MATH1821 and MATH2822) or STAT2601</td>
<td>Y Y</td>
<td>1 Dec</td>
<td>--- Dr S P Yung, Mathematics Minor in Computational &amp; Financial Mathematics Bachelor of Arts and Sciences in Applied Artificial Intelligence</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Prerequisites</td>
<td>Offered by</td>
<td>Credit Points</td>
<td>Mode</td>
<td>Pre-Requisites</td>
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</tr>
<tr>
<td>MATH3911</td>
<td>Game theory and strategy</td>
<td>Pass in (MATH2101 and MATH2211) or (MATH1821 and MATH2822)</td>
<td>Dr K H Law, Mathematics</td>
<td>6</td>
<td>Y</td>
<td>Y</td>
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<tr>
<td>MATH3943</td>
<td>Network models in operations research</td>
<td>Pass in (MATH2101 and MATH2211) or MATH2014, and Pass in MATH3901, or already enrolled in this course.</td>
<td>Prof W Zang, Mathematics</td>
<td>6</td>
<td>N</td>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Prerequisites</th>
<th>Corequisites</th>
<th>Instructors</th>
<th>Department</th>
<th>Year</th>
<th>Notes</th>
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<tbody>
<tr>
<td>APAI3001</td>
<td>Deep learning</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI3010</td>
<td>Image processing and computer vision</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI3021</td>
<td>Modern biostatistics</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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</tr>
<tr>
<td>APAI3799</td>
<td>Directed studies in Applied AI</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4001</td>
<td>Natural language processing</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4012</td>
<td>High-performance computing</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4022</td>
<td>Omics data analysis</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4023</td>
<td>Medical image analysis</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4099</td>
<td>Special topics of applied AI</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4766</td>
<td>Applied AI internship</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>APAI4798</td>
<td>Applied AI project</td>
<td>12</td>
<td>N Y</td>
<td>---</td>
<td>TBC</td>
<td>Bachelor of Arts and Sciences in Applied Artificial Intelligence (2019)</td>
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<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Notes</td>
<td>Prerequisites</td>
<td>Semester(s)</td>
<td>Course Coordinator</td>
<td></td>
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<tr>
<td>STAT2602</td>
<td>Probability and statistics II</td>
<td>Pass in STAT2601; and Not for students who have passed in STAT3902, or already enrolled in this course.</td>
<td>Y Y 1, 2</td>
<td>Dec, May</td>
<td>Dr K Zhu, Statistics &amp; Actuarial Science</td>
<td></td>
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<tr>
<td>STAT3600</td>
<td>Linear statistical analysis</td>
<td>Pass in STAT2602; and Not for students who have passed in STAT3907, or have already enrolled in this course.</td>
<td>Y Y 1, 2</td>
<td>Dec, May</td>
<td>Prof T W K Fung, Statistics &amp; Actuarial Science</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3612</td>
<td>Statistical machine learning</td>
<td>Pass in STAT2602 or (STAT1603 and any University level 2 course) or STAT3902; and Pass in STAT3600 or STAT3907, or already enrolled in these courses; and Not for students who have passed in STAT4904, or already enrolled in this course; and Not for BSc(Actuarial Science) students. BSc(Actuarial Science) students are advised to take STAT1404.</td>
<td>Y Y 1</td>
<td>No exam</td>
<td>Dr A J Zhang, Statistics &amp; Actuarial Science</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>STAT3622</td>
<td>Data visualization</td>
<td>Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or (STAT1603 and any University level 2 course) or STAT2901</td>
<td>Y Y 2</td>
<td>No exam</td>
<td>Dr A J Zhang, Statistics &amp; Actuarial Science</td>
<td></td>
<td></td>
<td></td>
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</table>

List of BASc(AppliedAI) Courses
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
<th>Y/N</th>
<th>Year</th>
<th>Pre-requisites</th>
<th>Instructor(s)</th>
<th>Notes</th>
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<tbody>
<tr>
<td>STAT4610</td>
<td>Bayesian learning</td>
<td>6</td>
<td>N Y</td>
<td>---</td>
<td>---</td>
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</table>
## Equivalency of HKDSE and Other Qualifications

### Table of Equivalence between HKDSE and Other Qualifications

<table>
<thead>
<tr>
<th>HKDSE</th>
<th>Grade</th>
<th>Equivalent Qualification to HKDSE</th>
<th>IB</th>
<th>GCE</th>
<th>SATII</th>
<th>AP</th>
<th>Gao Kao (高考)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biology</td>
<td>3 or above</td>
<td>Biology (SL/HL)</td>
<td>Biology (AL)</td>
<td>Biology</td>
<td>Biology</td>
<td></td>
<td>Equivalent to fulfillment of all HKDSE requirements</td>
</tr>
<tr>
<td>Chemistry</td>
<td>3 or above</td>
<td>Chemistry (SL/HL)</td>
<td>Chemistry (AL)</td>
<td>Chemistry</td>
<td>Chemistry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>3 or above</td>
<td>Physics (SL/HL)</td>
<td>Physics (AL)</td>
<td>Physics</td>
<td>Physics B or C</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>2 or above</td>
<td>Mathematics (SL)/Mathematical Studies (SL)</td>
<td>Mathematics (AL)</td>
<td>Mathematics Level 1 or 2</td>
<td></td>
<td>Calculus AB or BC</td>
<td></td>
</tr>
<tr>
<td>Mathematics + (M1 or M2)</td>
<td>2 or above</td>
<td>Mathematics (HL)/Mathematical Studies (HL)</td>
<td>Pure Mathematics (AL) Further Mathematics (AL)</td>
<td></td>
<td>Calculus AB or BC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:**
- HL: Higher Level
- SL: Standard Level
- AL: Advanced Level

**Remarks:**

For science students admitted through non-JUPAS scheme, the equivalent subject qualification(s) to HKDSE, if possessed, can be identified by the SIS for on-line course selection.

For other non-science students admitted through non-JUPAS scheme, they are still required to obtain the written approval from the Course Selection Adviser of the course offering department/school even they have possessed the equivalent HKDSE subject qualification(s) to meet the course prerequisite requirement. Once approval is given, they need to forward it to their home faculties to add the course on-line.
Programme Title: Bachelor of Arts and Sciences in Applied Artificial Intelligence

Offered to students admitted to Year 1 in 2019

Objectives:
The aim of this curriculum that spans across Architecture, Engineering, Science and Social Sciences is to equip students with theoretical foundations of artificial intelligence, as well as the necessary problem-solving (both qualitative and quantitative) and analytical skills, and nurture them to transfer interdisciplinary scientific knowledge into a wide range of integrated applications and technological innovations, generating in the process valuable practical experiences. Students will learn to develop the intellectual capacity essential for meeting new challenges and resolving new problems in the future.

Learning Outcomes:
By the end of this programme, students should be able to:

PLO 1: apprehend the concepts of artificial intelligence and its underlying theory in relation to a broad range of related disciplinary areas (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 2: be proficient with artificial intelligence techniques, and offer effective recommendations for innovative initiatives and solutions (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 3: acquire the necessary critical thinking, creative problem solving and communication skills for effective work and collaboration (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 4: communicate to people effectively and efficiently with professionalism and accuracy (by means of coursework and tutorial classes and/or research-based project in the curriculum)

PLO 5: gain insights into current advances and comprehensive knowledge of artificial intelligence to solve real-life problems (by means of coursework and tutorial classes and/or research-based project in the curriculum)

Impermissible Combinations:
Major in Decision Analytics
This programme will not be offered to non-BASc(AppliedAI) students as a second major.

Required courses of the Major in Applied Artificial Intelligence (96 credits)

1. Introductory Level Disciplinary Core Courses (48 credits)
   - APAI1001 Artificial intelligence: foundation, philosophy and ethics (6)
   - COMP1117 Computer programming (6)
   - COMP2119 Introduction to data structures and algorithms (6)
   - COMP2120 Computer organization (6)
   - MATH1013 University mathematics II (6)
   - MATH2014 Multivariable calculus and linear algebra (6)
   - STAT2601 Probability and statistics I (6)
   - STAT2602 Probability and statistics II (6)

2. Advanced Level Disciplinary Core Courses (18 credits)
   - APAI3001 Deep learning (6)
   - MATH3904 Introduction to optimization (6)
   - STAT3612 Statistical machine learning (6)

3. Concentration (Disciplinary Electives) (24 credits)
   (For fulfilling the requirement of a concentration, students should choose at least 18 credits, with at least 6 credits of which should be at advanced-level, from the corresponding list)

   (a) Concentration: AI Technology (at least 18 credits)
   - COMP3271 Computer graphics (6)
   - COMP3356 Robotics (6)
   - APAI3010 Image processing and computer vision (6)
   - APAI4011 Natural language processing (6)
   - APAI4012 High-performance computing (6)
   - APAI4099 Special topics of applied AI (6)

   (b) Concentration: AI in Business and Finance (at least 18 credits)
   - COMP3320 Electronic commerce technology (6)
   - MATH3901 Operations research I (6)
   - MATH3906 Financial calculus (6)
   - STAT3613 Marketing analytics (6)
   - STAT4601 Time-series analysis (6)
   - APAI4099 Special topics of applied AI (6)

   (c) Concentration: AI in Medicine (at least 18 credits)
   - STAT3955 Survival analysis (6)
   - STAT4610 Bayesian learning (6)
   - APAI3021 Modern biostatistics (6)
   - APAI4022 Omics data analysis (6)
   - APAI4023 Medical image analysis (6)
   - APAI4099 Special topics of applied AI (6)

   (d) Concentration: AI in Smart City (at least 18 credits)
   - URBS1003 Theories and Global Trends in Urban Development (6)
   - URBS1005 Urban Problems, Interventions and Design Thinking (6)
   - GEOG2090 Introduction to geographic information systems (6)
   - GEOG2092 GIS in environmental studies (6)
   - GEOG3420 Transport and society (6)
   - APAI4099 Special topics of applied AI (6)
(e) Concentration: AI in Neurocognitive Science (at least 18 credits)

PSYC1001 Introduction to psychology (6)
PSYC2051 Perception (6)
PSYC2066 Foundations of cognitive science (6)
PSYC2101 Foundations of neuroscience (6)
PSYC3054 Human neuropsychology (6)
APAI4099 Special topics of applied AI (6)

List of Other Elective Courses:

COMP3250 Design and analysis of algorithms (6)
COMP3278 Introduction to database management systems (6)
COMP3327 Computer and network security (6)
MATH3601 Numerical analysis (6)
MATH3911 Game theory and strategy (6)
MATH3943 Network models in operations research (6)
STAT3600 Linear statistical analysis (6)
STAT3622 Data visualization (6)
STAT4602 Multivariate data analysis (6)

4. Capstone Requirement (6 credits)

At least 6 credits selected from the following courses:

(If students take the 12-credit 'Applied AI project', they do not need to take a 6-credit elective from the 'List of Other Elective' Courses above. On the other hand, students who do not take the 12-credit 'Applied AI project' are allowed to take a course in one of the Concentrations as an elective.)

APAI3799 Directed studies in Applied AI (6)
APAI4766 Applied AI internship (6)
APAI4798 Applied AI project (12)

Notes:
1. Students are expected to be in full-time status for eight academic semesters (in additional to their 6-month or longer full-time internships) in order to fulfill the degree requirements.

2. Students may optionally take Majors or Minors outside the BASc(Applied AI) programme, provided that they fully satisfy the requirements.

Remarks:
Important! Ultimate responsibility rests with students to ensure that the required pre-requisites and co-requisite of selected courses are fulfilled. Students must take and pass all required courses in the programme in order to satisfy the degree graduation requirements.
The Core University English (CUE) course aims to enhance first-year students’ academic English language proficiency in the university context. CUE focuses on developing students’ academic English language skills for the Common Core Curriculum. These include the language skills needed to understand and produce spoken and written academic texts, express academic ideas and concepts clearly and in a well-structured manner and search for and use academic sources of information in their writing and speaking. Four online-learning modules through the Moodle platform on academic speaking, academic grammar, academic vocabulary, citation and referencing skills and avoiding plagiarism will be offered to students to support their English learning. This course will help students to participate more effectively in their first-year university studies in English, thereby enriching their first-year experience.

On successful completion of this course, students should be able to:

CLO 1 identify and distinguish between main ideas and supporting details in lectures and written texts and demonstrate an understanding of the arguments / facts expressed.

CLO 2 form and express personal opinions through critical reading and listening.

CLO 3 argue for and defend a position in a clear and structured way using academic sources, through writing and speaking.

CLO 4 demonstrate control of grammatical accuracy and lexical appropriacy in academic communication.

Excellent to outstanding result. Students are able to produce spoken and written academic texts which are at all times appropriately structured. Students can clearly and concisely explain academic concepts and clearly argue for a detailed position. Students always use appropriate academic sources to support their ideas in writing and speaking. They cite and reference correctly at all times. Students demonstrate an ability to fully comprehend and critically interpret spoken and written texts. Written language contains very few, if any, systematic errors in grammar and vocabulary. Spoken language is always comprehensible and fluent.

Good to very good result. Students are able to produce spoken and written academic texts which are appropriately structured with only minor errors. Students can almost always clearly and concisely explain academic concepts and almost always critically argue for a detailed position. Students almost always use appropriate academic sources to support their ideas in writing and speaking. They cite and reference correctly with only a few non-systematic errors. Students can comprehend and interpret texts with ease, although they may miss some implied meanings and opinions. Written language is mostly accurate but contains a few systematic errors in complex grammar and vocabulary. Spoken language is mostly comprehensible and fluent.

Satisfactory to reasonably good result. Spoken and written academic texts produced by students are sometimes not-well structured but there is some evidence of this ability. Students are sometimes unable to clearly and concisely explain academic concepts. While they can argue for a position, it is not very detailed and tend to be simplistic rather than critical. Students sometimes use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are some systematic errors in citation and referencing but also evidence of correct systematic use. Students have some difficulty comprehending and critically interpreting texts. They can always understand the main ideas but may miss some of the writer’s views and attitudes. Written language is sometimes inaccurate, although errors, when they occur, are more often in complex grammar and vocabulary. Spoken language is generally comprehensible and fluent but at times places strain on the listener.

Barely satisfactory result. Spoken and written academic texts produced by students are often inappropriately structured but there may be some evidence of this ability. Students are often unable to clearly and concisely explain academic concepts and argue for a position. There is some evidence of an ability to explain academic concepts but not to critically argue for a position. Students often use sources which are nonacademic and/or not appropriate to support their ideas in writing and speaking. There are many systematic errors in citation and referencing however there is evidence of an understanding of some of the conventions of citation and referencing. Students often have difficulty comprehending and interpreting texts, sometimes failing to understand the main ideas and writer’s views and attitudes. Written language is often inaccurate containing errors in a range of simple and complex grammar and vocabulary. Spoken language is only sometimes comprehensible and fluent, and strain is frequently placed on the listener.

Unsatisfactory result. Productive skills are too limited to be able to successfully carry out spoken and written assessments. Texts are unstructured and unclear. Students are unable to follow and interpret texts. There are language errors in almost every sentence. Spoken language is often incomprehensible. Assessments may not have been attempted or contain plagiarism.
CAES9820 Academic English for science students (6 credits) Academic Year 2019

Offering Department English Quota ---

Course Co-ordinator Dr E Law, English (ellielaw@hku.hk)

Teachers Involved (Dr E Law, Centre for Applied English Studies)

Course Objectives

This six credit English-in-the-Discipline course will be offered to second year students studying in the Science Faculty. This course will help students develop the necessary skills to use both written and spoken English within their studies. Students will learn to better communicate and spontaneously discuss general and scientific concepts within their division, with other scientists as well as to a larger audience. Particular emphasis will be placed on enabling students to identify their own language needs and develop appropriate self-learning strategies to improve their proficiency.

Course Contents & Topics

Topics covered in the course will be:
- Finding, evaluating and using appropriate academic source materials;
- Compiling an academic bibliography;
- Contrasting academic and popular genres of Science;
- Writing for a specific audience, including stance, shared knowledge, levels of formality; and
- Organizing and articulating ideas in an academically suitable format including appropriate vocabulary and grammar; and
- Critically examine their own language proficiency and analyze how that relates to their ability to perform successfully within their discipline. Developing self-directed learning strategies.

Course Learning Outcomes

On successful completion of this course, students should be able to:
- CLO 1 identify and summarize disciplinary sources related to a specified topic
- CLO 2 produce texts (written and spoken) appropriate for a cross-disciplinary audience based on their disciplinary knowledge
- CLO 3 identify their own language learning needs and implement a plan to meet those needs

Pre-requisites (and Co-requisites and Impermissible combinations)

NIL

Offer in 2019 - 2020 Y 1st sem 2nd sem Offer in 2020 - 2021 : Y

Examination No Exam

Grade Descriptors (A+ to F)

A Excellent result. Consistently demonstrates ability to summarize salient points accurately from appropriate and reliable sources using original language. Text uses sources appropriately and demonstrates accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are clearly identified and aligned with evidence of planning, self-study and reflection.

B Good to very good result. Usually demonstrates ability to summarize salient points accurately using mostly original language. Text mostly uses sources appropriately and demonstrates mostly accurate and appropriate grammatical, lexical and organizational characteristics. Language learning needs are stated with some reference to evidence of planning and reflection although there is some misalignment between goals and self-study completed.

C Satisfactory to reasonably good result. Demonstrates some ability to summarize salient points using mostly original language although some inaccuracies are present. Text uses some sources appropriately and demonstrates appropriate but simple grammatical and lexical characteristics with some organizational flaws. Language learning needs are stated with some limited evidence of planning and reflection but goals and self-study are misaligned.

D Barely satisfactory result. Demonstrates a limited ability to summarize salient points from sources with inaccuracies and little original language. Text uses sources inappropriately and demonstrates grammatical inaccuracy, inappropriate lexical choices and organizational flaws. There is a minimal statement of language learning needs, planning and reflection with little or no apparent alignment between goals and self-study.

Fail Unsatisfactory result. Does not demonstrate ability to summarize salient points identify, interpret or appropriately paraphrase reliable sources. Text uses no sources and demonstrates serious grammatical, lexical and/or organizational errors. Does not demonstrate any meaningful attempt to identify language learning needs or implement a plan.

Course Type Lecture-based course

Course Teaching & Learning Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tutorials</td>
<td>seminars</td>
<td>36</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>Assessment</td>
<td>independent learning work</td>
<td>84</td>
</tr>
</tbody>
</table>

Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>independent learning work</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Essay</td>
<td>other genres of writing</td>
<td>55</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>25</td>
<td></td>
</tr>
</tbody>
</table>

Required/recommended reading and online materials

Course materials to be provided electronically through course website.

Course Website http://caes.hku.hk/caes9820/

Additional Course Information

This a compulsory course for all students studying undergraduate degrees in the Faculty of Science.
# CAES9821

**Professional and technical communication for mathematical sciences (6 credits)**

<table>
<thead>
<tr>
<th>Academic Year</th>
<th>2019</th>
</tr>
</thead>
</table>

**Offering Department**

English

**Course Co-ordinator**

Dr E Law, English (ellielaw@hku.hk)

**Teachers Involved**

(Dr E Law, Centre for Applied English Studies)

**Course Objectives**

The course aims to develop students' professional and technical communication skills for disciplinary studies in mathematical sciences.

1. Case study report writing skills (report structure, language features, present and explain statistical data and trends, justify analyses and recommendations, etc.)
2. Oral presentation skills (understanding of audience and purpose, effective delivery, etc.)
3. Independent language learning (language learning goals setting, evaluating learning progress, reflecting on independent learning experience, etc.)

**Course Contents & Topics**

On successful completion of this course, students should be able to:

- CLO 1 present and explain mathematical and statistical data and trends using appropriate rhetorical skills
- CLO 2 organize and articulate coherent ideas with appropriate language devices in a case study report and an oral presentation
- CLO 3 justify analyses and recommendations convincingly in a case study report and an oral presentation
- CLO 4 identify their own language learning needs, develop independent learning strategies to address those needs, and reflect on their own independent language learning experience

**Pre-requisites (and Co-requisites and Impermissible combinations)**

NIL

**Offer in 2019 - 2020**

<table>
<thead>
<tr>
<th>Y</th>
<th>1st sem</th>
<th>2nd sem</th>
<th>Offer in 2020 - 2021: Y</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Examination</th>
<th>No Exam</th>
</tr>
</thead>
</table>

**Grade Descriptors (A+ to F)**

- **A** Wholly appropriate productive skills displaying a complete awareness of audience, purpose and structure across all disciplinary work. Students are able to critically analyse a case scenario, convincingly justify analyses and recommendations, and discuss data limitations when relevant. Students are able to successfully evaluate their language performance in all areas and propose specific and relevant future language learning plans. Spoken language is fully comprehensible and fluent. Written language contains a sophisticated range of grammar and vocabulary, with very few systematic errors.

- **B** Mostly appropriate productive skills displaying good awareness of audience, purpose and structure, although there are occasional lapses in areas. Students are able to analyse a case scenario, justify analyses and recommendations, and discuss data limitations when relevant. Students are able to evaluate their language performance in most areas and propose relevant future language learning plans. Spoken language is comprehensible and fluent. Written language contains a good range of grammar and vocabulary, making some systematic errors of language which generally do not impede understanding.

- **C** Productive skills are generally appropriate for the intended audience. There is an overall sense that the work is communicating successfully. Purposes are generally clear and tone is generally suitable. Students are generally able to analyse a case scenario and make recommendations, but the analysis and recommendations need more justification. Students are able to evaluate their language performance in a limited number of areas and proposed future language learning plans are rather vague. Spoken language is generally comprehensible and fluent. Written language contains inaccuracies when complex grammar and vocabulary are used.

- **D** Productive skills display weaknesses in awareness of purpose and audience. Tone is at times unsuitable. Students superficially analyse a case scenario, and the analyses and recommendations are vague. The structure is generally appropriate although links between sections may be lacking. Students are able to evaluate their language performance only in few areas and the proposed future language learning plans may not be relevant. Written language contains frequent errors in complex grammar and vocabulary, but the written work can still be followed by a patient and sympathetic audience. Spoken language is comprehensible and quite fluent, but stain is at times placed on the listener.

- **Fail** Productive skills show little or no awareness of audience or are too limited to be able to successfully carry out tasks. Students are unable to analyse a case scenario and make reasonable recommendations. Ideas are incoherent, vague and unstructured. Students are not able to evaluate their language performance and propose future language learning plans. There are frequent language errors in both simple and complex grammar in written work, which impede successful comprehension of ideas and points. Spoken language places considerable strain on the listener throughout. Assessments may not have been attempted or contain plagiarism.

**Course Type**

Lecture-based course

**Course Teaching & Learning Activities**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>seminars</td>
<td>30</td>
</tr>
<tr>
<td>Tutorials</td>
<td>small group tutorials</td>
<td>6</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
<td>120</td>
</tr>
<tr>
<td>Assessment</td>
<td>independent learning work</td>
<td>84</td>
</tr>
</tbody>
</table>

**Assessment Methods and Weighting**

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>40</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Presentation</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Project reports</td>
<td>30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Practical Chinese for science students (6 credits)

<table>
<thead>
<tr>
<th>Offering Department</th>
<th>Chinese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quota</td>
<td>---</td>
</tr>
<tr>
<td><strong>Course Objectives</strong></td>
<td>Chinese for professional communication. It helps the students to master the techniques of writing different types of documents such as memos, emails, letters, announcements, notice, brochures, leaflets, and reports. In addition, topics addressing presentation and discussion techniques, the style and rhetoric of reader-based writings are included to heighten the students' linguistic sensitivity.</td>
</tr>
<tr>
<td><strong>Course Contents &amp; Topics</strong></td>
<td>- Grammar &amp; vocabulary of modern Chinese - The Chinese writing system - Techniques of writing short messages: good-news and goodwill messages, bad-news messages, and persuasive messages - Techniques of writing electronic documents: emails; presentations - Styles and rhetoric of reader-based reports, proposals and presentations</td>
</tr>
<tr>
<td><strong>Course Learning Outcomes</strong></td>
<td>On successful completion of this course, students should be able to:</td>
</tr>
<tr>
<td>CLO 1</td>
<td>Develop a balanced competency in modern Chinese and write well-formed sentences</td>
</tr>
<tr>
<td>CLO 2</td>
<td>Employ rhetorical devices and stylistics, as well as practical writing skills specific to their discipline</td>
</tr>
<tr>
<td>CLO 3</td>
<td>Explore new tactics of communication, initiate discussions and debates and address new challenges</td>
</tr>
<tr>
<td>CLO 4</td>
<td>Apply their disciplinary knowledge and their Chinese writing skills and professional presentation techniques analytically, critically and creatively in different social or professional discourses</td>
</tr>
<tr>
<td><strong>Pre-requisites</strong></td>
<td>NIL</td>
</tr>
<tr>
<td><strong>Offer in 2019 - 2020</strong></td>
<td>Y 1st sem 2nd sem 2nd sem Offer in 2020 - 2021: Y</td>
</tr>
<tr>
<td><strong>Examination</strong></td>
<td>Dec May</td>
</tr>
<tr>
<td><strong>Grade Descriptors (A+ to F)</strong></td>
<td>A The student acquired a superb ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize the language techniques for effective communication in all situations.</td>
</tr>
<tr>
<td></td>
<td>B The student acquired the ability to achieve the intended learning outcomes of the course at all levels of learning: describe, apply, evaluate, and synthesize the language techniques for effective communication in most situations.</td>
</tr>
<tr>
<td></td>
<td>C The student acquired adequate ability to achieve the intended learning outcomes of the course at low levels of learning (i.e. describe, apply the language techniques for effective communication) but not at high levels of learning (i.e. evaluate and synthesize the techniques for effective communication).</td>
</tr>
<tr>
<td></td>
<td>D The student only has basic familiarity with the subject.</td>
</tr>
<tr>
<td></td>
<td>Fail The student has very limited familiarity with the subject.</td>
</tr>
<tr>
<td><strong>Course Type &amp; Learning Activities</strong></td>
<td>Lecture-based course</td>
</tr>
<tr>
<td><strong>Activities</strong></td>
<td>No. of Hours</td>
</tr>
<tr>
<td>Lectures</td>
<td>12</td>
</tr>
<tr>
<td>Tutorials</td>
<td>12</td>
</tr>
<tr>
<td>Group work</td>
<td>24</td>
</tr>
<tr>
<td>Discussion</td>
<td>24</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td>32</td>
</tr>
<tr>
<td>Assessment</td>
<td>16</td>
</tr>
<tr>
<td><strong>Assessment Methods</strong></td>
<td>Methods</td>
</tr>
<tr>
<td>Assignments</td>
<td>Self-access &amp; online exercises (40%) and Tutorial discussion (10%)</td>
</tr>
<tr>
<td>Examination</td>
<td>50</td>
</tr>
</tbody>
</table>
**Course Overview**

**Course Code:** MATH1013  
**Title:** University mathematics II (6 credits)  
**Offering Department:** Mathematics  
**Course Coordinator:** Dr C W Wong, Mathematics (cwwongab@hku.hk)  
**Quota:** 500

**Course Objectives**

This course aims at students with Core Mathematics plus Module 1 or Core Mathematics plus Module 2 background and provides them with basic knowledge of calculus and some linear algebra that can be applied in various disciplines. It is expected to be followed by courses such as MATH2012, MATH2101, MATH2102, MATH2211, and MATH2241.

**Course Contents & Topics**

- Functions; graphs; inverse functions.
- Limits; continuity and differentiability.
- Mean value theorem; Taylor's theorem; implicit differentiation; L'Hopital's rule.
- Higher order derivatives; maxima and minima; graph sketching.
- Radian, calculus of trigonometric functions.
- Definite and indefinite integrals; integration by substitutions; integration by parts; integration by partial fractions.
- Complex numbers, polar form, de Moivre's formula.
- Applications: Solving simple ordinary differential equations.
- Basic matrix and vector (of orders 2 and 3) operations, determinants of 2x2 or 3x3 matrices.

**Course Learning Outcomes**

On successful completion of this course, students should be able to:

- CLO 1 describe properties of functions and inverse functions
- CLO 2 evaluate limits, and determine continuity and differentiability of functions
- CLO 3 apply advanced rules/techniques of differentiation and integration to compute derivatives and integrals; sketch graphs of functions; approximation of functions
- CLO 4 solve problems involving complex numbers
- CLO 5 solve simple first and second order ordinary differential equations

**Grading Scheme**

- **A:** Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.
- **B:** Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analysing problems, with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.
- **C:** Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.
- **D:** Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.
- **Fail:** Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.

**Course Type**

Lecture-based course

**Course Teaching & Learning Activities**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Tutorials</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

**Assessment Methods and Weighting**

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Assignments</td>
<td>10</td>
<td>CLO 1,2,3,4,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Examination</td>
<td>50</td>
<td>CLO 1,2,3,4,5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Test</td>
<td>40</td>
<td>CLO 1,2,3,4,5</td>
<td></td>
</tr>
</tbody>
</table>

**Required/recommended reading and online materials**

- Adrian Banner: The Calculus Lifesaver: All the Tools You Need to Excel at Calculus (Princeton University Press, 2007)
- George B. Thomas, Maurice D. Weir and Joel Hass: Thomas' Calculus (12th edition, Addison Wesley)

**Course Website**

http://moodle.hku.hk/

**Additional Course Information**

Students who have passed MATH1013 are not allowed to take MATH1009.

Tutorial timetable:

## MATH2014 Multivariable calculus and linear algebra (6 credits)

**Offering Department**: Mathematics  
**Teaching Department**: Mathematics  
**Course Co-ordinator**: Dr H Y Zhang (hyzhang@maths.hku.hk)

**Course Objectives**: To provide students with a solid foundation in calculus of several variables and linear algebra, which they will need in the study of mathematics related subjects.

**Course Contents & Topics**
- Vectors and Matrices: Vectors in space, dot product and cross product, determinants (with geometric interpretations).
- Partial Derivatives: Functions of several variables, partial derivatives, extreme values and Lagrange multipliers, Taylor's formula.
- Multiple Integrals: Double and triple integrals, substitution in multiple integrals.
- Matrix Algebra: Matrix addition and multiplication, system of linear equations as a matrix equation.
- Vector Spaces: The Euclidean spaces as vector spaces, its subspaces, span of vectors, linear independence, basis and dimension.
- Eigenvalues and Eigenvectors: Diagonalization and computing powers.

**Course Learning Outcomes**: On successful completion of this course, students should be able to:

- **CLO 1**: understand the geometric meaning of partial and directional derivatives.
- **CLO 2**: optimize multivariate objective functions (with/without constraints).
- **CLO 3**: evaluate integrals over curvilinear regions in space.
- **CLO 4**: understand the concept of vector spaces, basis, dimension.
- **CLO 5**: solve simple eigenvalue problems and apply the theory to practical problems.

**Pre-requisites**: Pass in MATH1013 or (MATH1851 and MATH1853). Not for students who have passed MATH2822 or [(MATH2101 or MATH2102) and MATH2211], or have already enrolled in these courses.

**Offer in 2019 - 2020**: Y 1st sem 2nd sem  Offer in 2020 - 2021 : Y  

**Grade Descriptors (A+ to F)**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Demonstrate an excellent understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analyzing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.</td>
</tr>
<tr>
<td>B</td>
<td>Demonstrate a good understanding of key concepts and ideas by being able to identify the appropriate theorems and their applications through correctly analyzing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.</td>
</tr>
<tr>
<td>C</td>
<td>Demonstrate an acceptable understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analyzing problems with poor argument or presentation or a number of minor computational errors.</td>
</tr>
<tr>
<td>D</td>
<td>Demonstrate some understanding of key concepts and ideas by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analyzing problems with poor argument or presentation or with substantial computational errors.</td>
</tr>
<tr>
<td>Fail</td>
<td>Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.</td>
</tr>
</tbody>
</table>

**Course Type**: Lecture-based course

**Course Teaching & Learning Activities**

<table>
<thead>
<tr>
<th>Activity</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td>36</td>
</tr>
<tr>
<td>Tutorials</td>
<td>12</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td>100</td>
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</table>

**Assessment Methods and Weighting**

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<thead>
<tr>
<th>Assessment Methods</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>50</td>
<td>CLO 1,2,3,4,5</td>
</tr>
<tr>
<td>Test</td>
<td>50</td>
<td>CLO 1,2,3,4,5</td>
</tr>
</tbody>
</table>

**Course Website**: http://moodle.hku.hk/

**Additional Course Information**

- Tutorial timetable:  
MATH3601 Numerical analysis (6 credits)  
Offering Department: Mathematics  
Academic Year: 2019  
Offer in 2019 - 2020: Y  
1st sem  
Offer in 2020 - 2021: Y  
Examination: Dec  
Grade Descriptors (A+ to F)  
A Demonstrate an excellent understanding of key concepts and methods by being able to identify the appropriate theorems/algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out numerical procedures carefully and correctly, and with some innovative approaches to solving problems.  
B Demonstrate a good understanding of key concepts and methods by being able to identify the appropriate theorems/algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate algorithms or their applications or with some minor computational errors.  
C Demonstrate an acceptable understanding of key concepts and methods by being able to correctly identify appropriate theorems/algorithms, but with some inadequacies in applying the theorems/methods through incorrectly analysing problems with poor argument and presentation or with a number of minor computational errors.  
D Demonstrate some understanding of key concepts and methods by being able to correctly identify appropriate theorems/algorithms, but with substantial inadequacies in applying the theorems/methods through incorrectly analysing problems with poor argument and presentation or with substantial computational errors.  
Fail Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems/algorithms or their applications, or not being able to complete the solution.  
Course Type: Lecture-based course  
Course Learning Outcomes  
On successful completion of this course, students should be able to:  
CLO 1 construct and implement algorithms to find the zeros of functions, apply the bisection, Newton, Secant and fixed point iteration methods; and construct and implement Newton's method to solve a system of nonlinear equations.  
CLO 2 apply direct and iterative methods for solving linear equation systems  
CLO 3 construct interpolation polynomials in Lagrange, Newton, Hermite and spline forms  
CLO 4 understand the basic numerical integration and differentiation methods  
CLO 5 apply Euler methods and Runge-Kutta methods to solve initial value problems  
CLO 6 use software package such as Scilab or Matlab or Python to solve numerical problems  
Pre-requisites (and Co-requisites and Impermissible combinations)  
Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)  
Course Objectives  
This course covers both the theoretical and practical aspects of numerical analysis. Emphasis will be on basic principles and numerical methods of solution, using high speed computers.  
Course Contents & Topics  
- Different types of errors, condition number, and convergence order.  
- Polynomial interpolation and function approximation.  
- Solution of equations of one variable.  
- Direct and iterative methods for solving linear systems.  
- Numerical differentiation and integration.  
- Simple initial value problems for Ordinary Differential Equations.  
Assessment Methods and Weighting  
<table>
<thead>
<tr>
<th>Methods</th>
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<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examination</td>
<td>50</td>
<td>CLO 1,2,3,4,5,6</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td>50</td>
<td>CLO 1,2,3,4,5,6</td>
<td></td>
</tr>
</tbody>
</table>

course Website: http://moodle.hku.hk/  
Additional Course Information  
Tutorial timetable: http://hkumath.hku.hk/~math/ 
timetable1920_S1.pdf
**Course Objectives**

The objective is to provide a fundamental account of the basic results and techniques of Linear Programming (LP) and its related topics in operations research. The topics include the simplex method, the dual simplex method, parametric programming, decomposition method, cutting plane methods and branch and bound.

There is an equal emphasis on all the three aspects of theories, algorithms and applications. The course serves, together with the course MATH3943 Network Models in Operations Research, as essential concept and background for more advanced studies in operations research.

**Course Contents & Topics**

- Linear programming
- Duality theory
- Sensitivity analysis and parametric linear programming
- Integer programming methods

On successful completion of this course, students should be able to:

- CLO 1 understand the fundamental concept and approach of linear programming appropriate to the further study of operations research
- CLO 2 demonstrate knowledge and understanding of the underlying techniques of the simplex method and its extensions such as the dual simplex algorithm and the decomposition method
- CLO 3 understand and apply the theory of integer programming

**Pre-requisites**

Pass in MATH2014 or MATH2101 or MATH2102

**Grade Descriptors (A+ to F)**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.</td>
</tr>
<tr>
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<td>C</td>
<td>Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.</td>
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<tr>
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</tbody>
</table>

**Required/recommended reading and online materials**


**Additional Course Information**

- [Course Website](http://moodle.hku.hk/)
- [Tutorial timetable](http://hkumath.hku.hk/~math/Timetable/timetable1920_S1.pdf)
MATH3904 Introduction to optimization (6 credits) Academic Year 2019

Offering Department Mathematics

Course Co-ordinator Prof W Zang, Mathematics (wzang@maths.hku.hk)

Teachers Involved (Prof W Zang, Mathematics)

Course Objectives This course introduces students to the theory and techniques of optimization, aiming at preparing them for further studies in operations research, mathematical economics and related subject areas.

Course Contents & Topics
- Unconstrained and constrained optimization.
- Necessary conditions and sufficient conditions for optimality, convexity, duality.
- Algorithms and numerical examples.

Course Learning Outcomes On successful completion of this course, students should be able to:
CLO 1 demonstrate knowledge and understanding of the basic theory and techniques of optimization
CLO 2 solve various optimization problems encountered in practice
CLO 3 understand the connection between the purely analytical character of an optimization problem and the behavior of algorithms for solving it

Pre-requisites (and Co-requisites and Impermissible combinations) Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822)

Offer in 2019 - 2020 Y 1st sem Offer in 2020 - 2021 : Y Examination Dec

Grade Descriptors (A+ to F)

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Course Type Lecture-based course

Course Teaching & Learning Activities

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<td>Tutorials</td>
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Assessment Methods and Weighting

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</tr>
<tr>
<td>Test</td>
<td></td>
<td>50</td>
<td>CLO 1,2,3</td>
</tr>
</tbody>
</table>

Required/recommended reading and online materials
Instructor's lecture notes

Course Website http://moodle.hku.hk/

Additional Course Information Tutorial timetable:
http://hkumath.hku.hk/~math/Timetable/timetable1920_S1.pdf
# MATH3906 Financial calculus (6 credits)

### Offering Department
Mathematics

### Quota
---

### Course Co-ordinator
Dr S P Yung, Mathematics (spyung@hku.hk)

### Teachers Involved
(Dr S P Yung, Mathematics)

### Course Objectives
This course gives an elementary treatment for the modeling of financial derivatives, asset pricing and market risks from an applied mathematician's point of view. Stochastic calculus and solution methods will be introduced.

### Course Contents & Topics
- An introduction to financial instruments: stocks, bonds, options, forward and future contracts.
- Asset pricing: risk neutral relationship, no arbitrage principle, Brownian motion, stochastic calculus, Ito's Lemma, Black-Scholes model and its pricing partial differential equation.

### Course Learning Outcomes
On successful completion of this course, students should be able to:

- **CLO 1** understand the terminology and nature of bonds, interest rates, forwards, futures, stocks, options, and the no-arbitrage-principle
- **CLO 2** demonstrate knowledge on using binomial tree models to find option prices via the risk-neutral concept
- **CLO 3** describe basic properties of a Brownian motion and the Black-Scholes stock price model
- **CLO 4** implement stochastic calculus (such as Ito's Lemma) to derive Black-Scholes pricing partial differential equation on various type of options; and find a solution to this partial differential equation

### Pre-requisites
Pass in (MATH2101 and MATH2211) or MATH2014 or (MATH1821 and MATH2822) or STAT2601

### Offer in 2019 - 2020
Y 1st sem  Offer in 2020 - 2021 : Y

### Grade Descriptors (A+ to F)

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### Course Type
Lecture-based course

### Course Teaching & Learning Activities

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</thead>
<tbody>
<tr>
<td>Examination</td>
<td></td>
<td>50 CLO 1,2,3,4</td>
<td></td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>50 CLO 1,2,3,4</td>
<td></td>
</tr>
</tbody>
</table>

### Required/recommended reading and online materials


### Course Website
http://moodle.hku.hk/

### Additional Course Information

<table>
<thead>
<tr>
<th>Information</th>
<th>Details</th>
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</table>
# MATH3911 Game theory and strategy (6 credits)

**Offering Department:** Mathematics  
**Quota:** ---  
**Course Co-ordinator:** Dr K H Law, Mathematics (lawkaho@maths.hku.hk)  
**Teachers Involved:** (Dr K H Law, Mathematics)  
**Course Objectives:** Game theory is the logical analysis of situations of conflict and cooperation. This course will introduce the students to the basic ideas and techniques of mathematical game theory in an interdisciplinary context.

**Course Contents & Topics:**  
- Combinatorial games and Zermelo’s Theorem; Prisoner’s Dilemma; pure and mixed strategies, minimax theorem; mixed Nash equilibria.  
- Application to biology: evolutionary stable strategies; games in coalition form; Shapley value.  
- Application to politics: Shapley-Shubik power index; core and von Neumann-Morgenstern solution; bargaining set.

**Course Learning Outcomes:** On successful completion of this course, students should be able to:  
CLO 1 understand the basic terminology and solution concepts in game theory  
CLO 2 compute explicitly different solution concepts for some simple cooperative and non-cooperative games  
CLO 3 apply game theoretical ideas and methods to solve some problems in economics and biology

**Pre-requisites (and Co-requisites and Impermissible combinations):** Pass in (MATH2101 and MATH2211) or (MATH1821 and MATH2822)

**Offer in 2019 - 2020:** Y  
**Examination:** May

**Grade Descriptors (A+ to F):**

<table>
<thead>
<tr>
<th>Grade</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Demonstrate an excellent understanding of key concepts and ideas of Game Theory by being able to identify the appropriate theorems and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and being able to carry out computations carefully and correctly, and with some innovative approaches to solving problems.</td>
</tr>
<tr>
<td>B</td>
<td>Demonstrate a good understanding of key concepts and ideas of Game Theory by being able to identify the appropriate theorems and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.</td>
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<tr>
<td>C</td>
<td>Demonstrate an acceptable understanding of key concepts and ideas of Game Theory by being able to correctly identify appropriate theorems, but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.</td>
</tr>
<tr>
<td>D</td>
<td>Demonstrate some understanding of key concepts and ideas of Game Theory by being able to correctly identify appropriate theorems, but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.</td>
</tr>
<tr>
<td>Fail</td>
<td>Demonstrate poor and inadequate understanding by not being able to identify appropriate theorems or their applications, or not being able to complete the solution.</td>
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</tbody>
</table>

**Course Type:** Lecture-based course

### Course Teaching & Learning Activities

<table>
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<tr>
<td>Tutorials</td>
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<td>100</td>
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</tbody>
</table>

### Assessment Methods and Weighting

<table>
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<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>assignments, tutorials, participation etc</td>
<td>5</td>
<td>CLO 1,2,3</td>
</tr>
<tr>
<td>Examination</td>
<td></td>
<td>50</td>
<td>CLO 1,2,3</td>
</tr>
<tr>
<td>Project reports</td>
<td></td>
<td>20</td>
<td>CLO 1,2,3</td>
</tr>
<tr>
<td>Test</td>
<td></td>
<td>25</td>
<td>CLO 1,2,3</td>
</tr>
</tbody>
</table>

### Required/recommended reading and online materials

- **Textbook:** L.C. Thomas: Games, Theory and Applications (Dover Publications, 2003)  

**Course Website:** [http://moodle.hku.hk/](http://moodle.hku.hk/)  
**Additional Course Information:**  
Tutorial timetable: [http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf](http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf)
MATH3943 Network models in operations research (6 credits) Academic Year 2019

Offering Department Mathematics Quota ---

Course Co-ordinator Prof W Zang, Mathematics (wzang@maths.hku.hk)

Teachers Involved (Prof W Zang, Mathematics)

Course Objectives The objective is to provide a fundamental account of the basic results and techniques of network models in operations research. There is an equal emphasis on all three aspects of understanding, algorithms and applications. The course serves, together with a course on linear programming, to provide essential concept and background for more advanced studies in operations research.

Course Contents & Topics
- Graphs and algorithms.
- Trees, matchings and paths.
- Network models of transportation and assignment problems.
- Ford-Fulkerson network flow theory and computation for maximum flow and minimum cost flow algorithms.
- Applications to combinatorial optimization problems such as allocation, location and sequencing.
- Project networks, if time permits.

Course Learning Outcomes
On successful completion of this course, students should be able to:
CLO 1 understand the fundamental concept and approach of graphs and network models appropriate to the further study of operations research
CLO 2 demonstrate knowledge and understanding of the underlying techniques of the various graph and network algorithms and their extensions
CLO 3 understand the theory of network flows and the duality aspects in such methods of flow computations

Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in (MATH2101 and MATH2211) or MATH2014, and Pass in MATH3901, or already enrolled in this course.

Offer in 2019 - 2020
Y 2nd sem Offer in 2020 - 2021 : N Examination May

Grade Descriptors (A+ to F)
A Demonstrate an excellent understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, clearly and elegantly presenting correct logical reasoning and argumentation and being able to carry out computations carefully and correctly, and to solve problems with some innovative approaches.
B Demonstrate a good understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications through correctly analysing problems, but with some minor inadequacies in arguments, identifying the appropriate theorems or their applications and presentation or with some minor computational errors.
C Demonstrate an acceptable understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with some inadequacies in applying the theorems through incorrectly analysing problems with poor argument and presentation or a number of minor computational errors.
D Demonstrate some understanding of key concepts and ideas by being able to identify basic principles, appropriate theorems, algorithms and their applications but with substantial inadequacies in applying the theorems through incorrectly analysing problems with poor argument or presentation or with substantial computational errors.
Fail Demonstrate poor and inadequate understanding by not being able to identify basic principles, appropriate theorems, algorithms or their applications, or not being able to complete or compute the solution.

Course Type Lecture-based course

Course Teaching & Learning Activities
Activities Details No. of Hours
Lectures
Tutorials
Reading / Self study

Assessment Methods and Weighting
Methods Details Weighting in final course grade (%) Assessment Methods to CLO Mapping
Examination 50 CLO 1,2,3
Test 50 CLO 1,2,3

Required/recommended reading and online materials
M.S. Bazaraa, J.J. Jarvis and H.D. Sherali: Linear Programming and Network Flows. (2/e 1990)

Course Website http://moodle.hku.hk/

Additional Course Information
http://hkumath.hku.hk/~math/Timetable/timetable1920_S2.pdf
### Artificial intelligence: foundation, philosophy and ethics (6 credits)

**Offering Department**: Statistics & Actuarial Science  
**Course Co-ordinator**: Prof J F Yao, Statistics & Actuarial Science (jeffyao@hku.hk)

#### Course Objectives

The goal of this course is to expose students to the fundamental concepts of artificial intelligence (AI), including the history of AI, the classical and modern approaches, the main techniques used in AI, the challenges and major breakthroughs, the philosophical problems and ethical issues, and the application fields. This course is exclusive to BASc(AppliedAI) students.

#### Course Contents & Topics

The technical section will cover the following topics:  
1. Solving problems by searching; classical and adversarial search methods.  
2. Knowledge, reasoning and planning: first-order logic and inference; knowledge representation; classical, hierarchical and multiagent planning;  
3. Uncertain knowledge and reasoning: quantifying uncertainty, probabilistic reasoning; making decision under uncertainty.  
4. Learning: learning from examples, knowledge in learning, learning probabilistic models.

The section on philosophy will address three topics:  
1. Philosophical challenges to AI, concerning questions such as whether AI can achieve genuine understanding, with thoughts, conscious feelings, and emotions.  
2. Ethical and political issues related to the use of AI, such as privacy, legitimacy of human enhancement, and how AI might affect socio-economic inequality.  
3. The idea of singularity and the implications of AI for the future of humanity, and whether AI poses an existential threat.

#### Course Learning Outcomes

On successful completion of this course, students should be able to:

- **CLO 1** Apprehend the concepts of artificial intelligence and its underlying theory in relation to a broad range of related disciplinary areas.
- **CLO 2** Be proficient with artificial intelligence techniques, and offer effective recommendations for innovative initiatives and solutions.
- **CLO 3** Acquire the necessary critical thinking, creative problem solving skills and communication skills for effective work and collaboration.
- **CLO 4** Gain insights into current advances and comprehensive knowledge of artificial intelligence to solve real-life problems.
- **CLO 5** Communicate to people effectively and efficiently with professionalism and accuracy.

For BASc(AppliedAI) students only.

#### Course Type & Learning Activities

- **Lecture-based course**

- **Activities** | Details | No. of Hours |
  | | |
  | Lectures | | 36 |
  | Tutorials | | 12 |
  | Reading / Self study | | 100 |

#### Assessment Methods and Weighting

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<td>CLO 1, 2, 3, 4, 5</td>
</tr>
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<td>Examination</td>
<td></td>
<td>50</td>
<td>CLO 1, 3, 4</td>
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#### Required/recommended reading and online materials

2. Entry on AI in the [Stanford Encyclopedia of Philosophy](https://plato.stanford.edu/entries/artificial-intelligence/)

#### Course Website

http://moodle.hku.hk

### Additional Course Information

New course created for BASc AppliedAI  
Jointly offered by Department of Statistics and Actuarial Science, Department of Mathematics and Department of Philosophy
Course Objectives

The goal of this course is to introduce the mathematical, statistical and computational challenges in deep learning. It covers major deep learning algorithms under different settings, and their applications to solve real world problems.

Course Learning Outcomes

On successful completion of this course, students should be able to:

Grade Descriptors (A+ to F)

A  Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

B  Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C  Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

D  Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail  Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type

Lecture-based course

Assessment Methods and Weighting

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Course Teaching & Learning Activities

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Course Objectives

This course is a first-level introductory course to image processing. It covers a selected range of topics from elementary ones such as visual perception, image acquisition, to more advanced one such as object extraction, image segmentation, image restoration and texture modeling.

Course Learning Outcomes

On successful completion of this course, students should be able to:

- TBC

Pre-requisites (and Co-requisites and Impermissible combinations)

Offer in 2019 - 2020

N Offer in 2020 - 2021 : Y

Examination

Grade Descriptors (A+ to F)

A

Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

B

Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C

Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

D

Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail

Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type

Lecture-based course

Course Teaching & Learning Activities

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lectures</td>
<td></td>
<td>36</td>
</tr>
<tr>
<td>Tutorials</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
<td>100</td>
</tr>
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</table>

Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and class test(s))</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td></td>
<td>75</td>
<td></td>
</tr>
</tbody>
</table>
Course Objectives
This course is designed to introduce students the basic concepts and problems in the biology, medical, public health fields. Upon completion of the course, students would have background about epidemiology, population genetics, which are the foundations of the courses in the AI in medicine concentration.

Course Learning Outcomes
On successful completion of this course, students should be able to:

Course Contents & Topics

Pre-requisites (and Co-requisites and Impermissible combinations)
TBC

Offer in 2019 - 2020
N

Offer in 2020 - 2021 : Y

Examination
---

Grade Descriptors

(A+ to F)

A
Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

B
Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C
Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

D
Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail
Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type
Lecture-based course

Course Teaching & Learning Activities
Activities Details No. of Hours
Lectures
36
Tutorials
12

Assessment Methods and Weighting
Methods Details Weighting in final course grade (%) Assessment Methods to CLO Mapping
Assignments Coursework (assignments, tutorials, and class test(s)) 25
Examination
75
Course Objectives
The student undertakes a self-managed study on an applied topic in artificial intelligence under the supervision of a staff member. The topic is preferably one not sufficiently covered in the regular curriculum. The directed study can be a critical review or a synthesis of published work on the subject, or a laboratory or field study that would enhance students’ understanding of the subject. The project may not require an element of originality.

Course Contents & Topics

Course Learning Outcomes
On successful completion of this course, students should be able to:

Pre-requisites (and Co-requisites and Impermissible combinations)
TBC

Offer in 2019 - 2020
N

Examination
---

Grade Descriptors (A+ to F)

A
Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high-quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]

B
Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.

C
Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.

D
Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.

Fail
Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.

Course Type
Project-based course

Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reading / Self study</td>
<td>discussion &amp; meetings to be arranged by the student &amp; the supervisor</td>
<td>120</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Assessment Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral presentation</td>
<td>oral presentation &amp; in-class discussion</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Research report</td>
<td>written report</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>
Natural language processing (6 credits)

Offering Department: Statistics & Actuarial Science
Quota: TBC, ---

Course Objectives:
This course covers a broad range of topics in natural language processing (NLP), including word and sentence tokenization, text classification and sentiment analysis, spelling correction, information extraction, parsing, meaning extraction and question answering, etc. The underlying theory from probability, statistics, and machine learning will be introduced.

Course Contents & Topics:

Course Learning Outcomes:
On successful completion of this course, students should be able to:

Pre-requisites (and Co-requisites and Impermissible combinations):
TBC

Offer in 2019 - 2020:
N Offer in 2020 - 2021 : Y

Grade Descriptors (A+ to F):

A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

B: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

D: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Course Type:
Lecture-based course

Assessment Methods and Weighting:

<table>
<thead>
<tr>
<th>Assessment Methods</th>
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<th>Weighting in final course grade (%)</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and class test(s))</td>
<td>25</td>
<td></td>
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<tr>
<td>Examination</td>
<td></td>
<td>75</td>
<td></td>
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Course Teaching & Learning Activities:

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<thead>
<tr>
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<tbody>
<tr>
<td>Lectures</td>
<td>36</td>
</tr>
<tr>
<td>Tutorials</td>
<td>12</td>
</tr>
</tbody>
</table>
Course Objectives
This course aims to teach students the practical programming skills in Artificial Intelligence (AI), Machine Learning (ML), and Deep Learning (DL). First, students will learn basic concepts and algorithms for AI, ML, and DL, which are highly interdisciplinary field with applications in sciences and engineering, such as self-driving cars, healthcare, and computer vision. Some mathematical and computational issues will be covered.

Course Learning Outcomes
On successful completion of this course, students should be able to:

Pre-requisites
TBC

Offer in 2019 - 2020
N

Examina---

Grade Descriptors
(A+ to F)

A
Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

B
Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

C
Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

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Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

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Course Type
Lecture-based course

Assessment Methods and Weighting
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<tr>
<th>Methods</th>
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<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and class test(s))</td>
<td>50</td>
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<tr>
<td>Examination</td>
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<td>50</td>
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</table>
Offering Department: Statistics & Actuarial Science

Course Contents & Topics:
This course introduces Omics data acquisition techniques and emphasizes advanced statistical tools to analyze the high-throughput Omics data.

Course Objectives:
On successful completion of this course, students should be able to:

Pre-requisites:
TBC

Course Learning Outcomes:
On successful completion of this course, students should be able to:

Teachers Involved:
TBC

Course Objectives:
This course introduces Omics data acquisition techniques and emphasizes advanced statistical tools to analyze the high-throughput Omics data.

Course Contents & Topics:
This course introduces Omics data acquisition techniques and emphasizes advanced statistical tools to analyze the high-throughput Omics data.

Course Objectives:
On successful completion of this course, students should be able to:

Pre-requisites:
TBC

Course Learning Outcomes:
On successful completion of this course, students should be able to:

Grade Descriptors (A+ to F):

A: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

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Fail: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

Assessment Methods:

Assignments: Coursework (assignments, tutorials, and class test(s))

Examination

Assessment Methods to CLO Mapping

Assignments: 25

Examination: 75
### Course Details

**Course Code:** APAI4023  
**Course Name:** Medical image analysis (6 credits)  
**Academic Year:** 2019

**Offering Department:** Statistics & Actuarial Science  
**Course Co-ordinator:** TBC, ---  
**Quota:**

#### Teachers Involved

#### Course Objectives

The objective of this course is to provide students with an overview of the machine learning methods in medical image processing and analytics. We will study many of the current methods used to enhance and extract useful information from medical images. A variety of radiological diagnostic scenarios will be used as examples to motivate the methods.

#### Course Contents & Topics

#### Course Learning Outcomes

On successful completion of this course, students should be able to:

#### Pre-requisites (and Co-requisites and Impermissible combinations)

**Offer in 2019 - 2020:** N  
**Offer in 2020 - 2021:** Y

### Grade Descriptors (A+ to F)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
<th>Evidence</th>
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<tbody>
<tr>
<td>A</td>
<td>Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.</td>
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</tr>
<tr>
<td>C</td>
<td>Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.</td>
<td></td>
</tr>
<tr>
<td>Fail</td>
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### Assessment Methods

<table>
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<tr>
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<th>Weighting in final course grade (%)</th>
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</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and a class test)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Examination</td>
<td></td>
<td>75</td>
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</tr>
</tbody>
</table>

### Course Type

**Lecture-based course**

### Course Teaching & Learning Activities

<table>
<thead>
<tr>
<th>Activities</th>
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<th>No. of Hours</th>
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</thead>
<tbody>
<tr>
<td>Lectures</td>
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<td>36</td>
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<tr>
<td>Tutorials</td>
<td></td>
<td>12</td>
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</tbody>
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### APAI4099 - Special topics of applied AI (6 credits)

<table>
<thead>
<tr>
<th>Offering Department</th>
<th>Statistics &amp; Actuarial Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers Involved</td>
<td>TBC, --- ()</td>
</tr>
</tbody>
</table>

#### Course Objectives

Selective topics of applied AI in varying disciplines. Student seminars based on reading the predefined list of research papers. Guest lectures to be delivered by invited speakers (esp. industrial experts) to discuss the cutting-edge AI technologies in business and finance, medicine, smart city, neurocognitive science and other areas.

#### Course Contents & Topics

On successful completion of this course, students should be able to:

**Pre-requisites (and Co-requisites and Impermissible combinations)**

TBC

#### Offer in 2019 - 2020

<table>
<thead>
<tr>
<th>Offer in 2020 - 2021</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>---</td>
</tr>
</tbody>
</table>

#### Grade Descriptors (A+ to F)

<table>
<thead>
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<th>Details</th>
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<tbody>
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</tr>
<tr>
<td>B</td>
<td>Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.</td>
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<tr>
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<td>Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.</td>
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<tr>
<td>D</td>
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<tr>
<td>Fail</td>
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#### Course Type

Lecture-based course

#### Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
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<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, class test(s) and project(s))</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>
**Course Objectives**

This course is offered to BASc(AppliedAI) students who take on a minimum of 160 hours of project-driven internship work related to his/her major disciplines. It provides students with first-hand experience in the applications of academic knowledge in a real-life work environment.

**Course Learning Outcomes**

On successful completion of this course, students should be able to:

**Pre-requisites (and Co-requisites and Impermissible combinations)**

TBC

**Offer in 2019 - 2020**

<table>
<thead>
<tr>
<th>N</th>
<th>Offer in 2020 - 2021 : Y</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>---</td>
</tr>
</tbody>
</table>

**Grade Descriptors (Pass /Pass with distinction /Fail)**

| Pass | Able to apply knowledge to solve problems in the workplace. Successfully handles and carries out the work required in the job or assigned by supervisor(s). Establishes effective collaboration and communication with supervisor(s), colleagues, and clients in the job. Successfully fulfills the requirements set out in the Course Description regarding working hours, written and oral report, and evaluation by supervisor(s), etc. Students demonstrating excellent performance in the above would be awarded a grade of "Distinction". |
| Fail | Very limited or no ability to solve problems in the workplace. Fails to handle or carry out the work required in the job or assigned by supervisor(s). Fails to establish effective collaboration or communication with supervisor(s), other colleagues, or clients in the job. Fails to satisfy the requirements set out in the Course Description regarding working hours, written and oral report, or evaluation by supervisor(s), etc. |

**Course Type**

Internship

**Course Teaching & Learning Activities**

<table>
<thead>
<tr>
<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internship work</td>
<td>it is expected that students are to work at least 160 hours (or equivalent to 4 weeks full-time)</td>
<td>160</td>
</tr>
</tbody>
</table>

**Assessment Methods and Weighting**

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral presentation</td>
<td>oral presentation and in-class discussion</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Written report</td>
<td>written report</td>
<td>60</td>
<td></td>
</tr>
</tbody>
</table>
Course Objectives
Each year a few projects suitable for BASc(AppliedAI) students will be offered to provide students with practical experience in approaching a real problem, in report writing and in oral presentation. These projects, under the supervision of individual staff members, involve the applications of artificial intelligence in a wide range of problems of practical and/or academic interests.

Course Contents & Topics
On successful completion of this course, students should be able to:

Pre-requisites (and Co-requisites and Impermissible combinations)
TBC

Offer in 2019 - 2020
N

Grade Descriptors (A+ to F)
A
Demonstrate thorough grasp of the subject. Show strong analytical and critical abilities and logical thinking, with evidence of original thought. Insightful use and critical analysis / evaluation of information drawn from a full range of high-quality sources and to quote/reference aptly. Critical use of data and results to draw appropriate and insightful conclusions. Apply highly effective organizational and presentational skills. [Work of A+ should show considerable additional work beyond that is required in wider areas relevant to the topic.]

B
Demonstrate substantial grasp of the subject. Evidence of analytical and critical abilities and logical thinking. Critical use of relevant information from sources, showing ability to make meaningful comparisons between different secondary interpretations and to quote/reference aptly. Correct use of data of results to draw appropriate conclusions. Apply effective organizational and presentational skills.

C
Demonstrate general but incomplete grasp of the subject. Evidence of some analytical and critical abilities and logical thinking. Use of relevant information from sources, showing ability to make comparisons between different interpretations and to quote/reference aptly. Mostly correct but some erroneous use of data and results to draw appropriate conclusions. Apply moderately effective organizational and presentational skills.

D
Demonstrate partial but limited grasp, with retention of some relevant information, of the subject. Evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Demonstrate use and reference of several sources, but mainly through summary rather than analysis and comparison. Limited ability to use data and results to draw appropriate conclusions. Apply limited or barely effective organizational and presentational skills.

Fail
Demonstrate evidence of little or no grasp of the knowledge and understanding of the subject. Evidence of little or lack of analytical and critical abilities, logical and coherent thinking. Limited use of secondary sources and no critical comparison of them. Misuse of data and results and/or unable to draw appropriate conclusions. Organization and presentational skills are minimally effective or ineffective.

Assessment Methods and Weighting

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<tbody>
<tr>
<td>Dissertation</td>
<td>written report</td>
<td>60</td>
<td></td>
</tr>
<tr>
<td>Oral presentation</td>
<td>oral presentation &amp; in-class discussion</td>
<td>40</td>
<td></td>
</tr>
</tbody>
</table>
**STAT2601 Probability and statistics I (6 credits)**  
**Offering Department**: Statistics & Actuarial Science  
**Course Co-ordinator**: Dr K P Wat, Statistics & Actuarial Science (watkp@hku.hk)

**Course Objectives**: The discipline of statistics is concerned with situations in which uncertainty and variability play an essential role and forms an important descriptive and analytical tool in many practical problems. Against a background of motivating problems this course develops relevant probability models for the description of uncertainty and variability, and introduces the basic concepts of probability theory. The course also discusses some classical results in probability and statistics.

**Course Contents & Topics**:  
- Sample spaces; Operations of events; Probability and probability laws; Conditional probability; Independence;  
- Discrete random variables; Cumulative distribution function (cdf); Probability mass function (pmf); Bernoulli, binomial, geometric, and Poisson distributions; Continuous random variables; Cumulative distribution function (cdf);  
- Probability density function (pdf); Exponential, Gamma, and normal distributions; Functions of a random variable;  
- Joint distributions; Marginal distributions; Independent random variables; Functions of jointly distributed random variables; Expected value; Variance and standard deviation; Covariance and correlation.

**Course Learning Outcomes**: On successful completion of this course, students should be able to:
- **CLO 1**: Understand the basic concepts in probability theory.
- **CLO 2**: Gain some insights to statistics and inference.
- **CLO 3**: Solve real-world problem by using probability calculations.
- **CLO 4**: Pursue their further studies in statistics.

**Pre-requisites (and Co-requisites and Impermissible combinations)**:  
- Pass or already enrolled in MATH2101, or (MATH2101 and MATH2211), for students admitted in 2014 or thereafter; or  
- Pass in MATH1013, or already enrolled in this course, for students admitted in 2013 or before; or  
- Pass in MATH1851 and MATH1853, for students admitted in 2013 or before; and  
- Not for students who have passed in STAT1603, or already enrolled in this course; and  
- Not for students who have passed in STAT2901, or already enrolled in this course; and  
- Not for BSc(ActuarSc) students.

**Offer in 2019 - 2020**: Y  
**Grade Descriptors (A+ to F)**:  
- **A**: Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
- **B**: Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.
- **C**: Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.
- **D**: Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.
- **Fail**: Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

**Course Type**: Lecture-based course  
**Course Teaching & Learning Activities**:  
- Lectures: 36  
- Tutorials: 12  
- Reading / Self study: 100  

**Assessment Methods and Weighting**:  
- **Assignments**: Coursework (assignments, tutorials, and class test(s)) - 30%  
- **Examination**: One 2-hour written examination - 70%

**Required/recommended reading and online materials**:  

**Course Website**: http://moodle.hku.hk
### Course Objectives

This course builds on STAT2601, introducing further the concepts and methods of statistics. Emphasis is on the two major areas of statistical analysis: estimation and hypothesis testing. Through the disciplines of statistical modelling, inference and decision making, students will be equipped with both quantitative skills and qualitative perceptions essential for making rigorous statistical analysis of real-life data.

### Course Contents & Topics

1. Overview: random sample; sampling distributions of statistics; moment generating function; large-sample theory; laws of large numbers and Central Limit Theorem; likelihood; sufficiency; factorisation criterion; 2. Estimation: estimator; bias; mean squared error; standard error; consistency; Fisher information; Cramer-Rao Lower Bound; efficiency; method of moments; maximum likelihood estimator; 3. Hypothesis testing: types of hypotheses; test statistics; p-value; size; power; likelihood ratio test; Neyman-Pearson Lemma; generalized likelihood ratio test; Pearson chi-squared test; Wald tests; 4. Confidence interval: confidence level; confidence limits; equal-tailed interval; construction based on hypothesis tests.

### Course Learning Outcomes

On successful completion of this course, students should be able to:  
CLO 1 apprehend the objectives of statistics and its relation to probability theory  
CLO 2 relate a real-life problem to a formal framework for statistical inference  
CLO 3 conduct standard parametric statistical inference by means of estimation and hypothesis testing  
CLO 4 reckon the general applicability of statistics in a broad range of subject areas

### Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT2601; and Not for students who have passed in STAT3902, or already enrolled in this course.

### Offer in 2019 - 2020

<table>
<thead>
<tr>
<th>Grade Descriptors (A+ to F)</th>
<th>Offer in 2019 - 2020</th>
<th>No. of Hours</th>
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<tr>
<td>A</td>
<td>Y</td>
<td>36</td>
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<tr>
<td>B</td>
<td>Y</td>
<td>12</td>
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<td>C</td>
<td>Y</td>
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### Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials and a class test)</td>
<td>25</td>
<td>CLO 1,2,3,4</td>
</tr>
<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>75</td>
<td>CLO 1,2,3,4</td>
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</tbody>
</table>

### Required/recommended reading and online materials


### Course Website

http://moodle.hku.hk
# STAT3600

**Linear statistical analysis (6 credits)**

<table>
<thead>
<tr>
<th>Offering Department</th>
<th>Statistics &amp; Actuarial Science</th>
</tr>
</thead>
<tbody>
<tr>
<td>Course Co-ordinator</td>
<td>Prof T W K Fung, Statistics &amp; Actuarial Science (<a href="mailto:wingfung@hku.hk">wingfung@hku.hk</a>)</td>
</tr>
<tr>
<td>Teachers Involved</td>
<td>(Dr W T Li, Statistics &amp; Actuarial Science)</td>
</tr>
<tr>
<td></td>
<td>(Prof T W K Fung, Statistics &amp; Actuarial Science)</td>
</tr>
<tr>
<td>CLO 1</td>
<td>understand linear regression model with one or multiple independent variables</td>
</tr>
<tr>
<td>CLO 2</td>
<td>understand ANOVA models for one and two factors</td>
</tr>
<tr>
<td>CLO 3</td>
<td>understand general linear model with categorical and continuous independent variables</td>
</tr>
</tbody>
</table>

## Course Objectives

The analysis of variability is mainly concerned with locating the sources of the variability. Many statistical techniques investigate these sources through the use of 'linear' models. This course presents the theory and practice of these models.

### Course Contents & Topics

1. **Simple linear regression:** least squares method, analysis of variance, coefficient of determination, hypothesis tests and confidence intervals for regression parameters, prediction.
2. **Multiple linear regression:** least squares method, analysis of variance, coefficient of determination, reduced vs full models, hypothesis tests and confidence intervals for regression parameters, prediction, polynomial regression.
3. **One-way classification models:** one-way ANOVA, analysis of treatment effects, contrasts.
4. **Two-way classification models:** interactions, two-way ANOVA for balanced data structures, analysis of treatment effects, contrasts, randomised complete block design.
5. **Universal approach to linear modelling:** dummy variables, 'multiple linear regression' representation of one-way and two-way (unbalanced) models, ANCOVA models, concomitant variables.
6. **Regression diagnostics:** leverage, residual plot, normal probability plot, outlier, studentized residual, influential observation, Cook's distance, multicollinearity, model transformation.

### Course Learning Outcomes

On successful completion of this course, students should be able to:

- Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining most of the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.
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### Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in STAT2602; and Not for students who have passed in STAT3907, or have already enrolled in this course.

### Offer in 2019 - 2020

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<thead>
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<th>Grade Descriptors (A+ to F)</th>
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<th>2nd sem</th>
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<th>May</th>
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</table>

### Course Type

Lecture-based course

### Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
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<td></td>
<td>Assignments</td>
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<td>CLO 1, 2, 3</td>
</tr>
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<td></td>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>75</td>
<td>CLO 1, 2, 3</td>
</tr>
</tbody>
</table>

### Reading / Self Study


### Course Website

http://moodle.hku.hk
**Course Objectives**

Machine learning is the study of computer algorithms that build models of observed data in order to make predictions or decisions. Statistical machine learning emphasizes the importance of statistical theory and methodology in the algorithmic development. This course provides a comprehensive and practical coverage of essential machine learning concepts and a variety of learning algorithms under supervised and unsupervised settings. The course materials are presented with lots of examples and reproducible codes.

**Course Learning Outcomes**

On successful completion of this course, students should be able to:

- CLO 1 get familiar with the workflow of a data science or machine learning project
- CLO 2 understand and apply a wide range of statistical machine learning methods, and recognize their characteristics, strengths and weaknesses
- CLO 3 identify and use appropriate techniques for a particular data science project
- CLO 4 evaluate the quality of the resulting model in terms of prediction accuracy and model explainability
- CLO 5 apply R/Python programming for solving data-scientific problems

**Pre-requisites (and Co-requisites and Impermissible combinations)**

Pass in STAT2602 or (STAT1603 and any University level 2 course) or STAT3902; and Pass in STAT3600 or STAT3907, or already enrolled in these courses; and Not for students who have passed in STAT4904, or already enrolled in this course; and Not for BSc(Actuarial Science) students.

**BSc(Actuarial Science) students are advised to take STAT4904 Statistical learning for risk modelling instead.**

**Offer in 2019 - 2020**

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<th>Examination</th>
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**Course Type**

Lecture-based course

**Course Teaching & Learning Activities**

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<th>Activities</th>
<th>Details</th>
<th>No. of Hours</th>
</tr>
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<tbody>
<tr>
<td>Lectures</td>
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<td>36</td>
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<tr>
<td>Tutorials</td>
<td></td>
<td>12</td>
</tr>
<tr>
<td>Reading / Self study</td>
<td></td>
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<table>
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<tbody>
<tr>
<td>Assignments</td>
<td>30</td>
<td>CLO 1,2,3,5</td>
<td></td>
</tr>
<tr>
<td>Project reports</td>
<td>30</td>
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<td></td>
</tr>
<tr>
<td>Test</td>
<td>40</td>
<td>CLO 2,3</td>
<td></td>
</tr>
</tbody>
</table>

**Course Website**

http://moodle.hku.hk

**Required/recommended reading and online materials**

### Course Objectives

This course is designed to provide an overview and practical application of trends, technology and methodology used in the marketing survey process including problem formulation, survey design, data collection and analysis, and report writing. Special emphasis will be put on statistical techniques particularly for analysing marketing data including market segmentation, market response models, consumer preference analysis and conjoint analysis. Students will analyse a variety of marketing case studies.

### Course Contents & Topics

- Marketing decision models
- Market response models
- Survey research
- Statistical methods for segmentation
- Statistical methods for positioning
- Statistical methods for new product design

### Course Learning Outcomes

- **CLO 1** develop hands-on skills of curve fitting and analyzing data with SAS procedures or R packages
- **CLO 2** understand marketing decision models
- **CLO 3** understand cluster analysis, factor analysis, multidimensional scaling, correspondence analysis, conjoint analysis, choice models, confirmatory factor analysis, and discriminant analysis in market segmentation, positioning and new product design

### Pre-requisites (and Co-requisites and Impermissible combinations)

Pass in BIOL2102 or (ECON1280 and any University level 2 course) or (STAT1601 and any University level 2 course) or (STAT1602 and any University level 2 course) or STAT2601 or (STAT1603 and any University level 2 course) or STAT2901

### Grade Descriptors (A+ to F)

- **A** Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

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</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, a class test and a group project)</td>
<td>50</td>
<td>CLO 1,2,3</td>
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<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>50</td>
<td>CLO 1,2,3</td>
</tr>
</tbody>
</table>

### Required/recommended reading and online materials

- Lattin J., Carroll J.D. and Green P.E.: Analysing multivariate data (Thomson)
Course Objectives
This course will focus on how to work with statistical graphics, graphics that display statistical data, to communicate and analyze data. Students will learn a set of tools such as R to create these graphics and critically evaluate them.

Course Contents & Topics
Grammar of graphics, visualizing patterns over time, visualizing relationship, visualizing spatial relationships, visualizing texts.

Course Learning Outcomes
On successful completion of this course, students should be able to:

- CLO 1: choose the best chart that fits the data
- CLO 2: create a compelling visualization using computer software
- CLO 3: communicate effectively using statistical graphics
- CLO 4: critically evaluate graphics and suggest improvements

Pre-requisites
Pass in STAT2602 or STAT3902

Offer in 2019 - 2020
Y 2nd sem  Offer in 2020 - 2021 : Y

Examination
No Exam

Grade Descriptors
(A+ to F)
A
Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

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Course Type
Lecture-based course

Course Teaching & Learning Activities

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<tr>
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<td>Tutorials</td>
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<td>12</td>
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<tr>
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<td></td>
<td>100</td>
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Assessment Methods and Weighting

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<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Presentation</td>
<td>oral presentation and in-class discussion</td>
<td>40</td>
<td>CLO 1, 2, 3, 4</td>
</tr>
<tr>
<td>Project reports</td>
<td>written report</td>
<td>60</td>
<td>CLO 1, 2, 3, 4</td>
</tr>
</tbody>
</table>

Required/recommended reading and online materials


Course Website
http://moodle.hku.hk
Course Objectives

This course is concerned with how models which predict the survival pattern of humans or other entities are established. This exercise is sometimes referred to as survival-model construction.

Course Contents & Topics

The nature and properties of parametric and nonparametric survival models will be studied. Topics to be covered include: the introduction of some important basic quantities like the hazard function and survival function; some commonly used parametric survival models; concepts of censoring and/or truncation; parametric estimation of the survival distribution by maximum likelihood estimation method; nonparametric estimation of the survival functions from possibly censored samples by means of the Kaplan-Meier estimator, the Nelson-Aalen estimator; and the kernel density estimator or the Ramlau-Hansen estimator and comparisons of k independent survival functions by means of the generalized log-rank test; parametric regression models; Cox's semiparametric proportional hazards regression model; and multivariate survival analysis.

Course Learning Outcomes

On successful completion of this course, students should be able to:

- CLO 1 acquire a clear understanding of the nature of failure time data or survival data, a generalization of the concept of death and life
- CLO 2 perform estimation for some commonly used survival models under different types of censoring mechanisms
- CLO 3 analyze survival data using the Cox's semiparametric proportional hazards model
- CLO 4 extend the Cox's model to a multivariate setup to accommodate multivariate survival data

Pre-requisites (and Co-requisites and Impermissible combinations)

- Pass in STAT3902, or already enrolled in this course; or
- Pass in STAT3600 or STAT3901

Grade Descriptors (A+ to F)

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Assessment Methods and Weighting

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<td>25</td>
<td>CLO 1, 2, 3, 4</td>
</tr>
<tr>
<td>Examination</td>
<td>One 3-hour written examination</td>
<td>75</td>
<td>CLO 1, 2, 3, 4</td>
</tr>
</tbody>
</table>

Required/recommended reading and online materials


Course Website

http://moodle.hku.hk
STAT4601 Time-series analysis (6 credits)  Academic Year 2019

Offering Department Statistics & Actuarial Science  Quota ---

Course Co-ordinator Dr G Li, Statistics & Actuarial Science (gdli@hku.hk)

Teachers Involved (Dr G Li, Statistics & Actuarial Science)

Course Objectives
A time series consists of a set of observations on a random variable taken over time. Time series arise naturally in climatology, economics, environment studies, finance and many other disciplines. The observations in a time series are usually correlated; the course establishes a framework to discuss this. This course distinguishes different type of time series, investigates various representations for the processes and studies the relative merits of different forecasting procedures. Students will analyse real time-series data on the computer.

Course Contents & Topics
Stationarity and the autocorrelation functions; linear stationary models; linear non-stationary models; model identification; estimation and diagnostic checking; seasonal models and forecasting methods for time series.

Course Learning Outcomes
On successful completion of this course, students should be able to:

- CLO 1 recognize a stationary vs non-stationary time series
- CLO 2 understand some basic properties of commonly used time series models such as AR (autoregressive), MA (moving average) and ARMA models
- CLO 3 transform non-stationary time series into stationary ones
- CLO 4 identify different time series models based on autocorrelation functions
- CLO 5 fit a suitable AR, MA or ARMA model to real data using SAS (after transforming to stationarity if necessary)
- CLO 6 perform goodness of fit tests for such models
- CLO 7 do forecasting with these fitted time series models

Pre-requisites (and Co-requisites and Impermissible combinations)
Pass in STAT3600; and
Not for students who have passed in STAT3614, or have already enrolled in this course; and
Not for students who have passed in STAT3907, or have already enrolled in this course.

Offer in 2019 - 2020
Y 2nd sem  Offer in 2020 - 2021 : Y

Grade Descriptors (A+ to F)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
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<tbody>
<tr>
<td>A</td>
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<td>F</td>
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Course Type Lecture-based course

Course Teaching & Learning Activities

<table>
<thead>
<tr>
<th>Activities</th>
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<td>Lectures</td>
<td>36</td>
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<tr>
<td>Tutorials</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>Reading / Self study</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Methods</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and a class test)</td>
<td>40</td>
<td>CLO 1,2,3,4,5,6,7</td>
</tr>
<tr>
<td>Examination</td>
<td>One 2-hour written examination</td>
<td>60</td>
<td>CLO 1,2,3,4,6,7</td>
</tr>
</tbody>
</table>

Required/recommended reading and online materials

Course Website http://moodle.hku.hk
**Course: STAT4602 Multivariate data analysis (6 credits)**

**Offering Department:** Statistics & Actuarial Science  
**Quota:** 50

**Course Co-ordinator:** Prof T W K Fung, Statistics & Actuarial Science  
(wingfung@hku.hk)

**Teachers Involved:** (Prof T W K Fung, Statistics & Actuarial Science)

**Course Objectives:**
- In many designed experiments or observational studies, the researchers are dealing with multivariate data, where each observation is a set of measurements taken on the same individual. These measurements are often correlated. The correlation prevents the use of univariate statistics to draw inferences. This course develops the statistical methods for analysing multivariate data through examples in various fields of application and hands-on experience with the statistical software SAS.

**Course Contents & Topics:**

**Course Learning Outcomes:**
- On successful completion of this course, students should be able to:
  - CLO 1 analyze multivariate data with main SAS procedures, such as PROC IML, PROC REG, PROC CORR, PROC CANCORR, PROC PRINCOMP, PROC FACTOR, PROC DISCRIM, PROC CANDISC and etc.
  - CLO 2 compare the mean structure of multiple measurements for one or more than one population(s) by multivariate MANOVA and profile analysis
  - CLO 3 investigate the linear associations among one/two group(s) of variables by multiple, partial and canonical correlation and multivariate regression
  - CLO 4 explore the latent linear structure of a data set with multiple measurements by principal components analysis and factor analysis
  - CLO 5 classify observations of a population with one or more than one measurements by discriminant analysis

**Pre-requisites (and Co-requisites and Impermissible combinations):**
- Pass in STAT3600 or STAT3907

**Offer in 2019 - 2020:**
- Y 2nd sem  
- Offer in 2020 - 2021: Y

**Examination:**
- May

**Course Teaching & Learning Activities:**
- Grade Descriptors (A+ to F)
- Reading / Self study: 100
- Lectures: 36
- Tutorials: 12

**Assessment Methods and Weighting:**
- Methods: Coursework (assignments and tutorials)
- Weighting in final course grade (%): 25
- Assessment Methods to CLO Mapping: CLO 1,2,3,4,5
- One 3-hour written examination: 75
- CLO 1,2,3,4,5

**Required/recommended reading and online materials:**
- Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002)
- SAS Manuals on-line: Use the HELP button.

**Course Website:**
- http://moodle.hku.hk

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**Course Objectives:**
- To develop statistical methods for analysing multivariate data through examples in various fields of application and hands-on experience with the statistical software SAS.

**Course Contents & Topics:**

**Course Learning Outcomes:**
- On successful completion of this course, students should be able to:
  - CLO 1 analyze multivariate data with main SAS procedures, such as PROC IML, PROC REG, PROC CORR, PROC CANCORR, PROC PRINCOMP, PROC FACTOR, PROC DISCRIM, PROC CANDISC and etc.
  - CLO 2 compare the mean structure of multiple measurements for one or more than one population(s) by multivariate MANOVA and profile analysis
  - CLO 3 investigate the linear associations among one/two group(s) of variables by multiple, partial and canonical correlation and multivariate regression
  - CLO 4 explore the latent linear structure of a data set with multiple measurements by principal components analysis and factor analysis
  - CLO 5 classify observations of a population with one or more than one measurements by discriminant analysis

**Pre-requisites (and Co-requisites and Impermissible combinations):**
- Pass in STAT3600 or STAT3907

**Offer in 2019 - 2020:**
- Y 2nd sem  
- Offer in 2020 - 2021: Y

**Examination:**
- May

**Course Teaching & Learning Activities:**
- Grade Descriptors (A+ to F)
- Reading / Self study: 100
- Lectures: 36
- Tutorials: 12

**Assessment Methods and Weighting:**
- Methods: Coursework (assignments and tutorials)
- Weighting in final course grade (%): 25
- Assessment Methods to CLO Mapping: CLO 1,2,3,4,5
- One 3-hour written examination: 75
- CLO 1,2,3,4,5

**Required/recommended reading and online materials:**
- Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002)
- SAS Manuals on-line: Use the HELP button.

**Course Website:**
- http://moodle.hku.hk

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**Course Objectives:**
- To develop statistical methods for analysing multivariate data through examples in various fields of application and hands-on experience with the statistical software SAS.

**Course Contents & Topics:**

**Course Learning Outcomes:**
- On successful completion of this course, students should be able to:
  - CLO 1 analyze multivariate data with main SAS procedures, such as PROC IML, PROC REG, PROC CORR, PROC CANCORR, PROC PRINCOMP, PROC FACTOR, PROC DISCRIM, PROC CANDISC and etc.
  - CLO 2 compare the mean structure of multiple measurements for one or more than one population(s) by multivariate MANOVA and profile analysis
  - CLO 3 investigate the linear associations among one/two group(s) of variables by multiple, partial and canonical correlation and multivariate regression
  - CLO 4 explore the latent linear structure of a data set with multiple measurements by principal components analysis and factor analysis
  - CLO 5 classify observations of a population with one or more than one measurements by discriminant analysis

**Pre-requisites (and Co-requisites and Impermissible combinations):**
- Pass in STAT3600 or STAT3907

**Offer in 2019 - 2020:**
- Y 2nd sem  
- Offer in 2020 - 2021: Y

**Examination:**
- May

**Course Teaching & Learning Activities:**
- Grade Descriptors (A+ to F)
- Reading / Self study: 100
- Lectures: 36
- Tutorials: 12

**Assessment Methods and Weighting:**
- Methods: Coursework (assignments and tutorials)
- Weighting in final course grade (%): 25
- Assessment Methods to CLO Mapping: CLO 1,2,3,4,5
- One 3-hour written examination: 75
- CLO 1,2,3,4,5

**Required/recommended reading and online materials:**
- Srivastava M. S.: Methods of Multivariate Statistics (John Wiley and Sons, 2002)
- SAS Manuals on-line: Use the HELP button.

**Course Website:**
- http://moodle.hku.hk
### Course Objectives
This course aims to introduce Bayesian methodologies and computational techniques of Markov Chain Monte Carlo, and application in the deep learning.

### Course Learning Outcomes
On successful completion of this course, students should be able to:

### Pre-requisites (and Co-requisites and Impermissible combinations)

<table>
<thead>
<tr>
<th>Offer in 2019 - 2020</th>
<th>Examination</th>
</tr>
</thead>
<tbody>
<tr>
<td>N</td>
<td></td>
</tr>
</tbody>
</table>

### Grade Descriptors (A+ to F)

- **A**
  - Demonstrate thorough mastery at an advanced level of extensive knowledge and skills required for attaining all the course learning outcomes. Show strong analytical and critical abilities and logical thinking, with evidence of original thought, and ability to apply knowledge to a wide range of complex, familiar and unfamiliar situations. Apply highly effective organizational and presentational skills.

- **B**
  - Demonstrate substantial command of a broad range of knowledge and skills required for attaining at least most of the course learning outcomes. Show evidence of analytical and critical abilities and logical thinking, and ability to apply knowledge to familiar and some unfamiliar situations. Apply effective organizational and presentational skills.

- **C**
  - Demonstrate general but incomplete command of knowledge and skills required for attaining most of the course learning outcomes. Show evidence of some analytical and critical abilities and logical thinking, and ability to apply knowledge to most familiar situations. Apply moderately effective organizational and presentational skills.

- **D**
  - Demonstrate partial but limited command of knowledge and skills required for attaining some of the course learning outcomes. Show evidence of some coherent and logical thinking, but with limited analytical and critical abilities. Show limited ability to apply knowledge to solve problems. Apply limited or barely effective organizational and presentational skills.

- **Fail**
  - Demonstrate little or no evidence of command of knowledge and skills required for attaining the course learning outcomes. Lack of analytical and critical abilities, logical and coherent thinking. Show very little or no ability to apply knowledge to solve problems. Organization and presentational skills are minimally effective or ineffective.

### Course Type
Lecture-based course

### Assessment Methods and Weighting

<table>
<thead>
<tr>
<th>Method</th>
<th>Details</th>
<th>Weighting in final course grade (%)</th>
<th>Assessment Methods to CLO Mapping</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignments</td>
<td>Coursework (assignments, tutorials, and class test(s))</td>
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</tr>
<tr>
<td>Examination</td>
<td></td>
<td>75</td>
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</tbody>
</table>
Regulations for the Degree of Bachelor of Arts and Sciences in Applied Artificial Intelligence
[BASc(AppliedAI)]
For students admitted in 2019-2020 and thereafter

(See also General Regulations and Regulations for First Degree Curricula)

Definitions
AAI 1 In these Regulations, and in the Syllabuses for the degree of BASc(AppliedAI), unless the context otherwise requires
‘Course’ means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabus.
‘Credits’ means the value assigned to each course to indicate its study load relative to the total load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classrooms, and includes contact hours and time spent on assessment tasks and examinations.
‘Pre-requisite’ means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.
This regulation should be read in conjunction with UG 1 of the Regulations for First Degree Curricula.

Admission to the degree
AAI 2 To be eligible for admission to the degree of BASc(AppliedAI), candidates shall
(a) comply with the General Regulations;
(b) comply with the Regulations for First Degree Curricula; and
(c) satisfy all the requirements of the curriculum in accordance with these regulations and the syllabuses.

Period of study
AAI 3 The curriculum shall normally require eight semesters of full-time study, extending over not fewer than four academic years, and shall include any assessment to be held during and/or at the end of each semester. Candidates shall not in any case be permitted to extend their studies beyond the maximum period of registration of six academic years, unless otherwise permitted or required by the Board of the Faculty.

Curriculum requirements and progression in curriculum
AAI 4 (a) Candidates shall satisfy the requirements prescribed in UG 5 of the Regulations for First Degree Curricula¹, except that in the case of the Common Core Curriculum, 24 credits shall be required, comprising one course from each Area of Inquiry. Specific requirements are spelt out in the syllabuses.
(b) Candidates shall complete not fewer than 240 credits of courses.

¹ Candidates who have achieved Level 5 or above in English Language in the Hong Kong Diploma of Secondary Education Examination (HKDSE), or equivalent, are exempted from taking “CAES1000 Core University English”. In exceptional circumstances, strong candidates who have achieved Level 4 may be considered for admission to the curriculum but they will be required to take “CAES1000 Core University English” as supplementary credits and complete 246 credits for graduation from the University.
(c) Candidates shall successfully complete not fewer than 96 credits of courses for the major, including 66 credits of core courses, 18-24 credits of disciplinary electives, 6-12 credits of capstone experience requirement.

(d) Candidates shall successfully complete 18 credits of BASc core courses.

(e) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the final semester of study when the number of outstanding credits required to complete the curriculum requirements may be fewer than 24 credits.

(f) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load of 288 credits for the normative period of study specified in AAI 3, save as provided for under AAI 4(g).

(g) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load of 432 credits for the maximum period of registration specified in AAI 3.

Selection of courses

AAI 5 Candidates who wish to change their selection of courses at the beginning of each semester may do so up to 2 weeks after the commencement of the semester. Requests for changes beyond the 2-week deadline will not be permitted, except for medical or other reasons accepted by the Board of the Faculty, and candidates’ withdrawal from any course without permission will result in a fail grade.

Assessment

AAI 6 Candidates shall be assessed in each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits. Grades shall be awarded in accordance with UG 8 of the Regulations for First Degree Curricula.

AAI 7 Candidates are required to make up for failed courses in the following manner:

(a) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or

(b) re-submitting failed coursework, without having to repeat the same course of instruction; or

(c) repeating the failed course by undergoing instruction and satisfying the assessments; or

(d) for elective courses, taking another course in lieu and satisfying the assessment requirements.

AAI 8 Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.

AAI 9 There shall be no appeal against the results of examinations and all other forms of assessment.
Discontinuation of studies

AAI 10 Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:

(a) failed to complete 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters; or
(b) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester); or
(c) exceeded the maximum period of registration specified in AAI 3.

Absence from examination

AAI 11 Candidates who are unable, because of illness, to be present at the written examinations of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the first semester of the following academic year. Any such application shall normally be made on the form prescribed within two weeks of the first day of the candidate’s absence from any examination. Any supplementary examination shall be part of that academic year’s examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.

Advanced standing

AAI 12 Advanced standing may be granted to candidates in recognition of studies successfully completed before admission to the curriculum in accordance with UG 2 of the Regulations for First Degree Curricula. Advanced credits shall not normally be included in the calculation of the GPA unless otherwise permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

Credit transfer

AAI 13 Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

Award of the degree

AAI 14 To be eligible for award of the degree of BASc(Applied AI), candidates shall have
(a) achieved a Graduation GPA of 1.00 or above;
(b) passed a minimum of 240 credits, comprising 96 credits of the required courses of the Applied Artificial Intelligence major as prescribed in the degree of BASc(Applied AI) curriculum, and 18 credits of BASc core courses; and
(c) satisfied the requirements in UG 5 of the Regulations for First Degree Curricula, and specified in AAI 4(a).
Honours classification

AAI 15 (a) Honours classification shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Graduation GPA (GGPA) scores, with all courses taken (including failed courses) carrying weightings which are proportionate to their credit values:

<table>
<thead>
<tr>
<th>Class of honours</th>
<th>GGPA range</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class Honours</td>
<td>3.60 – 4.30</td>
</tr>
<tr>
<td>Second Class Honours</td>
<td>(2.40 – 3.59)</td>
</tr>
<tr>
<td>Division One</td>
<td>3.00 – 3.59</td>
</tr>
<tr>
<td>Division Two</td>
<td>2.40 – 2.99</td>
</tr>
<tr>
<td>Third Class Honours</td>
<td>1.70 – 2.39</td>
</tr>
<tr>
<td>Pass</td>
<td>1.00 – 1.69</td>
</tr>
</tbody>
</table>

(b) Honours classification may not be determined solely on the basis of a candidate’s Graduation GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in AAI 15(a) of the higher classification by not more than 0.1 Grade Point.

(c) A list of candidates who have successfully completed all the degree requirements shall be posted on Faculty noticeboards.
REGULATIONS FOR FIRST DEGREE CURRICULA

Regulations for First Degree Curricula (for students admitted under the 4-year ‘2012 curriculum’ to the first year in the academic year 2019-20 and thereafter)

(See also General Regulations)

UG 1 Definitions:

For the purpose of regulations and syllabuses for all first degree curricula unless otherwise defined —

An ‘academic year’ comprises two semesters, the first semester to commence in September and end in December, and the second semester to commence in January and end in May/June, on dates as prescribed by the Senate. It includes, normally at the end of each semester, a period during which candidates are assessed. For some curricula, a ‘summer semester’ may be organized in addition to the normal two semesters. Clinical curricula have extended semesters.

A ‘summer semester’ normally comprises seven to eight weeks of intensive timetabled teaching and assessment to commence four weeks after the end of the second semester assessment period, and to conclude about one week before the start of the next academic year.

The ‘maximum period of registration’ is equivalent to a period which is 150% of the curriculum’s normative period of study as specified in the degree regulations, provided that where this results in a residual fraction of an academic year, the fractional period shall be extended to one full academic year.

‘Degree curriculum’ means the entire study requirements for the award of an undergraduate degree.

‘Major programme’ means the study requirements, including a capstone experience, for a single major area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 72 credits nor more than 96 credits, as prescribed in the syllabuses for a degree curriculum.

‘Minor programme’ means the study requirements for a single minor area of disciplinary, interdisciplinary or multidisciplinary study, accumulating not fewer than 36 credits nor more than 48 credits, as prescribed in the syllabuses for a degree curriculum.

‘Professional core’ refers to the study requirements, including a capstone experience, prescribed in the regulations and syllabuses for disciplinary studies in degree curricula which are not structured as major/minor programmes for reasons relating to professional qualification and/or accreditation.

‘Course’ means a course of study, with a credit value expressed as a number of credit-units as specified in the syllabuses for a degree curriculum.

‘Disciplinary elective course’ or ‘Disciplinary Elective’ means any course offered in the same major or minor programme or the professional core which can be taken by candidates to fulfill the curriculum requirements as specified in the syllabuses of the degree curriculum.

‘Elective course’ or ‘Elective’ means any course offered within the same or another curriculum, other than compulsory courses in the candidate’s degree curriculum, that can be

1 These regulations are applicable to candidates admitted from 2019-20 onwards. Reference in these regulations to the powers of the Boards of Faculties shall be applicable to Senate Boards of Studies which administer first degree curricula.
taken by the candidate in order to complete the credit requirements of the degree curriculum.

‘Capstone experience’ refers to one or more courses within the major programme or professional core which are approved by the Board of the Faculty for the purpose of integrating knowledge and skills acquired, and which are prescribed in the syllabuses of the degree curriculum.

‘Syllabus’ means courses taught by departments, centres, and schools, offered under a degree curriculum.

‘Prerequisite’ means a course or a group of courses which candidates must have completed successfully or a requirement which candidates must have fulfilled before being permitted to take the course in question.

‘Corequisite’ means a course which candidates must take in conjunction with the course in question.

‘Credits’ or ‘credit-units’ means the value assigned to each course to indicate its study load relative to the total study load under a degree curriculum. The study load refers to the hours of student learning activities and experiences, both within and outside the classroom, and includes contact hours and time spent on assessment tasks and examinations. Candidates who satisfactorily complete courses with a credit value earn the credits assigned to these courses.

‘Grade Points’ are standardized measurements of candidates’ academic achievement in courses taken to satisfy the requirements of the degree curriculum and are expressed as a scale prescribed in these regulations.

‘Grade Point Average’ is a numerical measure of a candidate’s academic achievement over a specified period of time. Each course attempted (including each failed course) is assigned a numerical value, with all courses carrying equal weighting. This numerical value is the product of grade points earned for the course and the credit value of that course. The ‘Grade Point Average’ is the sum of these numerical values divided by the total number of credits attempted:

$$GPA = \frac{\sum_i \text{Course Grade Point} \times \text{Course Credit Value}}{\sum_i \text{Course Credit Value}}$$

(where ‘i’ stands for all passed and failed courses taken by the student over a specified period)

‘Semester Grade Point Average’ or ‘Semester GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) during a given semester.

‘Year Grade Point Average’ or ‘Year GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) during a given academic year.

‘Cumulative Grade Point Average’ or ‘Cumulative GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) at the time of calculation.

‘Graduation Grade Point Average’ or ‘Graduation GPA’ is the GPA in respect of courses attempted by a candidate (including failed courses) at the point of graduation. For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core courses with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.

‘Assessment’ refers to judgment about the quality and extent to which a student has achieved the stated learning objectives or learning outcomes. It includes all types of assessment activities which allow for such a judgment to be made. For the purpose of interpreting the relevant provisions of the Ordinance and the Statutes and where appropriate,
reference to ‘examination’ or 'examinations' in the Ordinance and the Statutes shall include and cover all forms of ‘assessment’ and its related processes.

A ‘transcript’ refers to a transcript of the record of study of a candidate, issued by the Registry of the University.

UG 2  Advanced standing:

Advanced standing may be granted to candidates in recognition of studies completed successfully before admission to the curriculum. Candidates who are awarded Advanced Standing will not be granted any further credit transfer for those studies for which Advanced Standing has been granted. The amount of credits to be granted for advanced standing shall be determined by the Board of the Faculty, in accordance with the following principles:

(a) at least half the number of credits of the degree curriculum normally required for award of the degree shall be accumulated through study at this University or from transfer of credits for courses completed at other institutions in accordance with Regulation UG 4(d); and

(b) in accordance with Statute III.5 and notwithstanding the granting of advanced and/or transfer credits, a minimum of two semesters of study at this University shall be required before a candidate is considered for the award of a first degree, other than a degree in medicine or surgery, and a minimum of four semesters of study at this University shall be required before a candidate is considered for a first degree in medicine or surgery.

Credits granted for advanced standing shall not normally be included in the calculation of the GPA unless permitted by the Board of the Faculty but will be recorded on the transcript of the candidate.

UG 3  Period of study:

The period of study of the curriculum shall be specified in the regulations governing the degree. To be eligible for award of the degree, a candidate shall fulfill all curriculum requirements within the maximum period of registration, unless otherwise permitted or required by the Board of the Faculty.

UG 4  Progression in curriculum:

(a) Candidates shall normally be required to take not fewer than 24 credits nor more than 30 credits in any one semester (except the summer semester) unless otherwise permitted or required by the Board of the Faculty, or except in the last semester of study when the number of outstanding credits required to complete the curriculum requirements is fewer than 24 credits.

(b) Candidates may, of their own volition, take additional credits not exceeding 6 credits in each semester, and/or further credits during the summer semester, accumulating up to a maximum of 72 credits in one academic year. With the special permission of the Board of the Faculty, candidates may exceed the annual study load of 72 credits in a given academic year provided that the total number of credits taken does not exceed the maximum curriculum study load for the normative period of study specified in the curriculum regulations, save as provided for under UG4(c).

(c) Where candidates are required to make up for failed credits, the Board of the Faculty may give permission for candidates to exceed the annual study load of 72 credits provided that the total number of credits taken does not exceed the maximum curriculum study load for the maximum period of registration specified in the curriculum regulations.

(d) Candidates may, with the approval of the Board of the Faculty, transfer credits for courses completed at other institutions at any time during their candidature. The
number of transferred credits may be recorded in the transcript of the candidate, but the results of courses completed at other institutions shall not be included in the calculation of the GPA. The number of credits to be transferred shall not exceed half of the total credits normally required under the degree curricula of the candidates during their candidature at the University.

(e) Unless otherwise permitted by the Board of the Faculty, candidates shall be recommended for discontinuation of their studies if they have:

(i) failed to complete successfully 36 or more credits in two consecutive semesters (not including the summer semester), except where they are not required to take such a number of credits in the two given semesters, or

(ii) failed to achieve an average Semester GPA of 1.0 or higher for two consecutive semesters (not including the summer semester), or

(iii) exceeded the maximum period of registration specified in the regulations of the degree.

UG 5 Requirements for graduation:

To be eligible for admission to the degree, candidates shall fulfill the following requirements in addition to the requirements prescribed in the regulations and syllabuses governing the degree curriculum within the maximum period of registration:

(a) successful completion of 12 credits in English language enhancement, including 6 credits in Core University English\(^2\) and 6 credits in an English in the Discipline course\(^3\);

(b) successful completion of 6 credits in Chinese language enhancement\(^4\);

(c) unless otherwise prescribed in the curriculum regulations and syllabuses, successful completion of 36 credits of courses in the Common Core Curriculum, comprising at least one and not more than two courses from each Area of Inquiry\(^5\) with not more than 24 credits of course being selected within one academic year except where candidates are required to make up for failed credits; and

(d) successful completion of a capstone experience as specified in the syllabuses of the degree curriculum.

UG 6 Exemption:

Candidates may be exempted, with or without special conditions attached, from any of the requirements in UG 5 by the Senate in exceptional circumstances. Candidates who are so

\(^2\) Candidates who have achieved Level 5** in English Language in the Hong Kong Diploma of Secondary Education Examination, or equivalent, may at the discretion of the Faculty be exempted from this requirement and should take an elective course in lieu, see Regulation UG6.

\(^3\) (a) To satisfy the English in the Discipline (ED) requirement, candidates who have passed the ED course for a Major but subsequently change that Major are required to pass the ED course for the new Major, or either of the double Majors finally declared upon graduation irrespective of whether the second Major is offered within or outside of the candidates’ home Faculty.

(b) Candidates declaring double Majors can, if they fail in the ED course for one of the Majors, either (i) re-take and successfully complete that failed ED course, or (ii) successfully complete the ED course for the other Major, irrespective of whether the Major is offered within or outside of the candidates’ home Faculty.

(c) Candidates who undertake studies in double Majors or double degrees are not required to take a second ED course but may be advised by the Faculty to do so.

\(^4\) Candidates who have not studied Chinese language during their secondary education may be exempted from this requirement and should take an elective course in lieu, see Regulation UG6.

\(^5\) Candidates registered for dual degree studies are required to successfully complete 24 credits of courses in the Common Core Curriculum, selecting one course from each Area of Inquiry, within the curriculum of the first degree, as appropriate.
exempted must replace the number of exempted credits with courses of the same credit value.

UG 7 Assessment:

(a) Candidates shall be assessed for each of the courses for which they have registered, and assessment may be conducted in any combination of continuous assessment of coursework, written examinations and/or any other assessable activities. Only passed courses will earn credits.

(b) Candidates who are unable, because of illness, to be present at the written examination of any course may apply for permission to present themselves at a supplementary examination of the same course to be held before the beginning of the First Semester of the following academic year. Any such application shall be made on the form prescribed within two weeks of the first day of the candidate’s absence from any examination. Any supplementary examination shall be part of that academic year’s examinations, and the provisions made in the regulations for failure at the first attempt shall apply accordingly.

(c) Candidates suspended under Statute XXXI shall not be allowed to take, present themselves for, and participate in any assessments during the period of suspension, unless otherwise permitted by the Senate.

(d) Candidates shall not be permitted to repeat a course for which they have received a D grade or above for the purpose of upgrading.

(e) Candidates are required to make up for failed courses in the following manner as prescribed in the curriculum regulations:
   (i) undergoing re-assessment/re-examination in the failed course to be held no later than the end of the following semester (not including the summer semester); or
   (ii) re-submitting failed coursework, without having to repeat the same course of instruction; or
   (iii) repeating the failed course by undergoing instruction and satisfying the assessments; or
   (iv) for elective courses, taking another course in lieu and satisfying the assessment requirements.

(f) There shall be no appeal against the results of examinations and all other forms of assessment.

UG 8 Grading system:

(a) The grades, their standards and the grade points for assessment shall be as follows:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Standard</th>
<th>Grade Point</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>Excellent</td>
<td>4.3</td>
</tr>
<tr>
<td>A</td>
<td>Excellent</td>
<td>4.0</td>
</tr>
<tr>
<td>A-</td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>B+</td>
<td>Good</td>
<td>3.3</td>
</tr>
<tr>
<td>B</td>
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<td>3.0</td>
</tr>
<tr>
<td>B-</td>
<td></td>
<td>2.7</td>
</tr>
<tr>
<td>C+</td>
<td>Satisfactory</td>
<td>2.3</td>
</tr>
<tr>
<td>C</td>
<td>Satisfactory</td>
<td>2.0</td>
</tr>
<tr>
<td>C-</td>
<td></td>
<td>1.7</td>
</tr>
<tr>
<td>D+</td>
<td>Pass</td>
<td>1.3</td>
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<tr>
<td>D</td>
<td></td>
<td>1.0</td>
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<tr>
<td>F</td>
<td>Fail</td>
<td>0</td>
</tr>
</tbody>
</table>

6 UG 8 is not applicable to the respective Professional Core of the BDS and MBBS curricula.
(b) Special permission may be given by Senate for courses in individual curricula to be graded as ‘Pass’, ‘Fail’ or ‘Distinction’. Such courses will not be included in the calculation of the GPA.

UG 9 Honours classifications:

(a) Honours classifications shall be awarded in five divisions: First Class Honours, Second Class Honours Division One, Second Class Honours Division Two, Third Class Honours, and Pass. The classification of honours shall be determined by the Board of Examiners for the degree in accordance with the following Graduate GPA scores, with all courses taken (including failed courses) carrying equal weighting which are proportionate to their credit values:

<table>
<thead>
<tr>
<th>Class of honours</th>
<th>GPA range</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Class Honours</td>
<td>3.60 – 4.30</td>
</tr>
<tr>
<td>Second Class Honours Division One</td>
<td>(2.40 – 3.59)</td>
</tr>
<tr>
<td>Division Two</td>
<td>2.40 – 2.99</td>
</tr>
<tr>
<td>Third Class Honours</td>
<td>1.70 – 2.39</td>
</tr>
<tr>
<td>Pass</td>
<td>1.00 – 1.69</td>
</tr>
</tbody>
</table>

(b) Honours classification may not be determined solely on the basis of a candidate’s Graduation GPA and the Board of Examiners for the degree may, at its absolute discretion and with justification, award a higher class of honours to a candidate deemed to have demonstrated meritorious academic achievement but whose Graduation GPA falls below the range stipulated in UG9(a) of the higher classification by not more than 0.1 Grade Point.

(c) A list of candidates who have successfully completed all degree requirements shall be posted on Faculty noticeboards.

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7 UG 9 is not applicable to the BChinMed, BDS and MBBS curricula.
8 For students in the 2017-18 intake and thereafter who have successfully completed six Common Core courses, the calculation of Graduation GPA is subject to the proviso that either five Common Core course with the highest grades (covering all four Areas of Inquiry), or all six courses will be counted towards Graduation GPA, depending on which generates the higher Graduation GPA.
## Teaching Weeks 2019-20 for Undergraduate and Taught Postgraduate Students

### Teaching Weeks

#### First Semester: SEP 2 - DEC 23, 2019

<table>
<thead>
<tr>
<th>Week</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>First Day of Teaching: Sep 2, 2019</td>
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<tr>
<td>2</td>
<td>Reading/Field Trip Week: Oct 14 - 19, 2019</td>
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<tr>
<td>3</td>
<td>Revision Period: Dec 2 - 6, 2019</td>
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<tr>
<td>4</td>
<td>Last Day of Teaching: Nov 30, 2019</td>
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<tr>
<td>5</td>
<td>Assessment Period: Dec 7 - 23, 2019</td>
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</tbody>
</table>

#### Second Semester: JAN 20 - MAY 30, 2020

<table>
<thead>
<tr>
<th>Week</th>
<th>Notes</th>
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<tbody>
<tr>
<td>1</td>
<td>First Day of Teaching: Jan 20, 2020</td>
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<td>2</td>
<td>Class Suspension Period for the Lunar New Year: Jan 25 - 31, 2020</td>
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<tr>
<td>3</td>
<td>Reading/Field Trip Week: Mar 9 - 14, 2020</td>
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<td>4</td>
<td>Last Day of Teaching: May 2, 2020</td>
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<td>5</td>
<td>Assessment Period: May 4 - 9, 2020</td>
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</table>

#### Optional Summer Semester

<table>
<thead>
<tr>
<th>Week</th>
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<td>1</td>
<td>JUN 29 - AUG 22, 2020</td>
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### Teaching Calendar

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<tr>
<th>SUN</th>
<th>MON</th>
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### Notes

- General Holiday
- Revision Period
- University Holiday (afternoon only)
- Class Suspension Period for the Lunar New Year
- Assessment Period

### First Semester: 11 Mondays and Tuesdays, 12 Wednesdays, Thursdays and Fridays, 11 Saturdays

### Second Semester: 11 Mondays, 13 Tuesdays and Wednesdays, 12 Thursdays, 10.5 Fridays, 11 Saturdays
## Useful contacts and websites

### Faculty of Science
- **Office Location:** Ground Floor, Chong Yuet Ming Physics Building
- **Tel:** 3917 2683
- **Fax:** 2858 4620
- **Email:** science@hku.hk
- **Website:** https://www.scifac.hku.hk/

*Please visit [https://www.scifac.hku.hk/](https://www.scifac.hku.hk/) for the latest updates of BSc courses, timetables, notices and forms*

### Departments/Schools
- **Biological Sciences**
  - **Website:** https://www.biosch.hku.hk/
- **Biomedical Sciences**
  - **Website:** http://www.sbms.hku.hk/
- **Chemistry**
  - **Website:** https://www.chemistry.hku.hk/
- **Earth Sciences**
  - **Website:** https://www.earthsciences.hku.hk/
- **Mathematics**
  - **Website:** https://hkumath.hku.hk/web/index.php
- **Physics**
  - **Website:** https://www.physics.hku.hk/
- **Statistics and Actuarial Science**
  - **Website:** https://saasweb.hku.hk/

### Academic Advising Office
- **Tel:** 3917 0128
- **Website:** http://aao.hku.hk

### Academic Services Office
- **Office Location:** G04, Run Run Shaw Building
- **Tel:** 2859 2433
- **Fax:** 2540 1405
- **Email:** asoffice@hku.hk
- **Website:** http://www.ase.hku.hk

### Common Core courses
- **Website:** https://commoncore.hku.hk/

### HKU Worldwide Undergraduate Exchange Programme
- **Website:** https://aal.hku.hk/studyabroad/

### Centre of Development and Resources for Students (CEDARS)
- **Tel:** 3917 2305
- **Website:** https://www.cedars.hku.hk/

### University Health Service
- **Tel:** 3917 2501 (General enquiries)
  2549 4686 (Medical appointments only)
- **Website:** http://www.uhs.hku.hk

### Plagiarism
- **Website:** https://tl.hku.hk/plagiarism/