



## ICT 371 Artificial Intelligence T320 Brief

All information in the Subject Outline is correct at the time of approval. KOI reserves the right to make changes to the Subject Outline if they become necessary. Any changes require the approval of the KOI Academic Board and will be formally advised to those students who may be affected by email and via Moodle.

Information contained within this Subject Outline applies to students enrolled in the trimester as indicated

### 1. General Information

#### 1.1 Administrative Details

Associated HE Award(s)	Duration	Level	Subject Coordinator
Bachelor of Information Technology (BIT)	1 trimester	Level 3	Dr Saeid Iranmanish <a href="mailto:saeid.iranmanesh@koi.edu.au">saeid.iranmanesh@koi.edu.au</a> P: 92833583 L: Level 1-2, 17 O'Connell St. Consultation: via Moodle or by appointment.

#### 1.2 Core / Elective

Elective subject for BIT

#### 1.3 Subject Weighting

Indicated below is the weighting of this subject and the total course points.

Subject Credit Points	Total Course Credit Points
4	BIT (96 Credit Points)

#### 1.4 Student Workload

Indicated below is the expected student workload per week for this subject

No. Timetabled Hours/Week*	No. Personal Study Hours/Week**	Total Workload Hours/Week***
4 hours/week (2 hour Lecture + 2 hour Tutorial)	6 hours/week	10 hours/week

\* Total time spent per week at lectures and tutorials

\*\* Total time students are expected to spend per week in studying, completing assignments, etc.

\*\*\* Combination of timetable hours and personal study.

#### 1.5 Mode of Delivery

Blended, that is face-to-face/online

#### 1.6 Pre-requisites

ICT104 Program Design and Development and Successful completion of 48 credit points

#### 1.7 General Study and Resource Requirements

- Dedicated computer laboratories are available for student use. Normally, tutorial classes are conducted in the computer laboratories
- Students are expected to attend classes with the requisite textbook and must read specific chapters prior to each tutorial. This will allow them to actively take part in discussions. Students should have elementary skills in both word processing and electronic spreadsheet software, such as Office 365 or MS Office
- Computers and WIFI facilities are extensively available for student use throughout KOI. Students are encouraged to make use of the campus Library for reference materials
- Students will require access to the internet and email. Where students use their own computers, they should have internet access. KOI will provide access to required software.

Resource requirements specific to this subject: Rapid miner, Office 365, MS Imagine.

## 2 Academic Details









### 2.1 Overview of the Subject

The goal of Artificial Intelligence is to build software systems that behave "intelligently". That is, do these computer systems "do the right thing" in complex environments? Do they act optimally given the limited information and computational resources available? How is this aim interpreted? This subject covers the core topics of Artificial Intelligence such as knowledge representation, reasoning, and learning. Students will learn to design and analyse autonomous agents that do the right thing in the face of limited computational resources and limited information. This subject examines agents that can effectively make decisions in fully observable, partially observable and adversarial environments, and agents that can adapt their actions by learning from experience.

### 2.2 Graduate Attributes for Undergraduate Courses

Graduates of Bachelor courses from King's Own Institute (KOI) will achieve the graduate attributes expected under the Australian Qualifications Framework (2<sup>nd</sup> edition, January 2013). Graduates at this level will be able to apply a broad and coherent body of knowledge across a range of contexts for the purposes of professional practice or academic scholarship, and as a pathway for further learning.

King's Own Institute's key generic graduate attributes for a bachelor's level degree are summarised below:

	<b>KOI Bachelor Degree Graduate Attributes</b>	<b>Detailed Description</b>
	Knowledge	Current, comprehensive, and coherent and connected knowledge
	Critical Thinking	Critical thinking and creative skills to analyse and synthesise information and evaluate new problems
	Communication	Communication skills for effective reading, writing, listening and presenting in varied modes and contexts and for transferring knowledge and skills to a variety of audiences
	Information Literacy	Information and technological skills for accessing, evaluating, managing and using information professionally
	Problem Solving Skills	Skills to apply logical and creative thinking to solve problems and evaluate solutions
	Ethical and Cultural Sensitivity	Appreciation of ethical principles, cultural sensitivity and social responsibility, both personally and professionally
	Teamwork	Leadership and teamwork skills to collaborate, inspire colleagues and manage responsibly with positive results
	Professional Skills	Professional skills to exercise judgement in planning, problem solving and decision making





Across the course, these skills are developed progressively at three levels:

- **Level 1 Foundation** – Students learn the basic skills, theories and techniques of the subject and apply them in basic, standalone contexts
- **Level 2 Intermediate** – Students further develop the skills, theories and techniques of the subject and apply them in more complex contexts, and begin to integrate this application with other subjects.
- **Level 3 Advanced** – Students demonstrate an ability to plan, research and apply the skills, theories and techniques of the subject in complex situations, integrating the subject content with a range of other subject disciplines within the context of the course.

## 2.3 Subject Learning Outcomes

This is a Level 3 subject.

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

Subject Learning Outcomes	Contribution to Graduate Attributes
a) Identify problems that are amenable to solution by AI methods and select AI methods suited to solving such problems	
b) Formulate a given problem in the language/framework of different AI methods (for example, as a search problem, as a constraint satisfaction problem, or as a planning problem)	
c) Analyse AI algorithms (e.g., standard search or constraint propagation algorithms)	
d) Solve simple problems using AI techniques and algorithms.	

## 2.4 Subject Content and Structure

Below are details of the subject content and how it is structured, including specific topics covered in lectures and tutorials. Reading refers to the text unless otherwise indicated.

*Weekly Planner:*

Week (beginning)	Topic covered in each week's lecture	Reading(s)	Expected work as listed in Moodle
1 02 Nov	Introduction to AI	Ch. 1	Tutorial exercises based on lecture topics are intended to stimulate discussion. Discussing AI applications and understanding the latest AI technologies. Formative not graded.
2 09 Nov	Intelligent Agents	Ch. 2	Tutorial exercises based on lecture topics are intended to stimulate discussion. Introduction to rapid miner as an AI tool. Formative not graded.
3 16 Nov	Solving Problem by Searching	Ch. 3	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: Data loading and problem understanding, problem space understanding Formative not graded.
4 23 Nov	Beyond Classical Search	Ch. 4	Tutorial exercises based on lecture topics are intended to stimulate discussion. Discussing and analysing genetic algorithm in terms of cross-over, mutation, parent selection, local and absolute minima/maxima. Formative not graded.

5 30 Nov	Adversarial search	Ch. 5	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: decision tree. Formative not graded
6 07 Dec	Constraint satisfaction problem	Ch. 6	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: artificial neural network. Formative not graded <b>Assessment 1 due:</b> Search Analysis- Individual assignment. Summative worth 20%
7 14 Dec	Logical Agent	Ch. 7	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: K-means Formative not graded
20 Dec 2020 – 03 Jan 2021	<b>Mid trimester break</b>		
8 04 Jan	First order logic	Ch. 8	Tutorial exercises based on lecture topics are intended to stimulate discussion. Discussing logic programming to build a solver. Formative not graded
9 11 Jan	Probability reasoning	Ch. 14	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: text mining. Formative not graded.
10 18 Jan	Learning from examples 1	Ch. 18	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: Association Rules Formative not graded.
11 25 Jan	Learning from examples 2	Ch. 18	Tutorial exercises based on lecture topics are intended to stimulate discussion. Rapid Miner: Some Tips for Assignment 2 Formative not graded.
12 01 Feb	Revision		Revise all tutorial exercises. Formative not graded. <b>Assessment 2 due:</b> Knowledge based Schemes - group project - Group Project. Summative worth 30%
13 07 Feb	Study review week		
14 15 Feb	Examination		Please see exam timetable for exam date, time and location
15 21 Feb	Student Vacation begins Enrolments for T121 open		
16 02 Mar	Results Released 02 Mar 2021 Certification of Grades 05 Mar 2021		
<b>T121 begins 09 Mar 2021</b>			
1 08 Mar	Week 1 of classes for T121 <b>Friday 05 Mar 2021 – Review of Grade Day for T320</b> – see Sections 2.6 and 3.2 below for more information.		

## 2.7 Teaching Methods/Strategies

Briefly described below are the teaching methods/strategies used in this subject:

- *Lectures* (2 hours/week) are conducted in seminar style and address the subject content, provide motivation and context and draw on the students' experience and preparatory reading.
- *Tutorials* (2 hours/week) include class discussion of case studies and research papers, practice sets and problem-solving and syndicate work on group projects. Tutorials often include group exercises and so contribute to the development of teamwork skills and cultural understanding. Tutorial participation is an essential component of the subject and contributes to the development of many of the graduate attributes (see section 2.2 above). Tutorial participation contributes towards the assessment in many subjects (see details in Section 3.1 for this subject). Supplementary tutorial material such as case studies, recommended readings, review questions etc. will be made available each week in Moodle.
- *Online* teaching resources include class materials, readings, model answers to assignments and exercises and discussion boards. All online materials for this subject as provided by KOI will be found in the Moodle page for this subject. Students should access Moodle regularly as material may be updated at any time during the trimester
- *Other contact* - academic staff may also contact students either via Moodle messaging, or via email to the email address provided to KOI on enrolment.

## 2.8 Student Assessment

Assessment is designed to encourage effective student learning and enable students to develop and demonstrate the skills and knowledge identified in the subject learning outcomes. Assessment tasks during the first half of the study period are usually intended to maximise the developmental function of assessment (formative assessment). These assessment tasks include weekly tutorial exercises (as indicated in the weekly planner) and low stakes graded assessment (as shown in the graded assessment table). The major assessment tasks where students demonstrate their knowledge and skills (summative assessment) generally occur later in the study period. These are the major graded assessment items shown in the graded assessment table.

Final grades are awarded by the Board of Examiners in accordance with KOI's Assessment and Assessment Appeals Policy. The definitions and guidelines for the awarding of final grades within the BIT degree are:

- HD High distinction (85-100%) an outstanding level of achievement in relation to the assessment process.
- DI Distinction (75-84%) a high level of achievement in relation to the assessment process.
- CR Credit (65-74%) a better than satisfactory level of achievement in relation to the assessment process.
- P Pass (50-64%) a satisfactory level of achievement in relation to the assessment process.
- F Fail (0-49%) an unsatisfactory level of achievement in relation to the assessment process.

Provided below is a schedule of formal assessment tasks and major examinations for the subject.

Assessment Type	When assessed	Weighting	Learning Outcomes Assessed
Assessment 1: Search analysis individual assignment	Weeks 6	20%	b, c, d
Assessment 2: Knowledge based Schemes - group project	Week 12	30%	a, b, c, d
Assessment 3: final exam (2,5 hours plus 10 minutes reading time.)	Final exam period	50%	a, b, d

*Requirements to Pass the Subject:*

To gain a pass or better in this subject, students must gain a *minimum of 50%* of the total available subject marks.

## 2.9 Prescribed Readings

***Prescribed Texts:***

Russell, S, & Norvig, P 2016, Artificial Intelligence: A Modern Approach, Global 3<sup>rd</sup>. edition, Pearson Education Limited, Harlow, United Kingdom. Available from: ProQuest Ebook Central. [16 June 2020].