Assessment Information/Brief for Semester 2

Assessment Title:	AI Coursework	
Module Title:	Artificial Intelligence and Data Mining	
Module CRN:	34123	Weighting: 50% of the total module mark
Level:	5	Issue date: Friday 28^{th} February 2025, Week 24 (T2.7)
School:	SEE	Submission date: 4pm Friday 28^{th} March 2025, Week 28 (T2.11)

Any submission received after 16:00 (even if only by a few seconds) will be considered as late. Students with a Reasonable Adjustment Plan (RAP) or Carer Support Plan should check their plan to see if an extension to this submission date has been agreed.

1 Assessment Set by Dr Bryant

- Dr Bryant's surgeries (office hours) take during the teaching part of the semester. The time of his next surgery is shown on Blackboard's calendar. Please note that this is a drop-in service. In other words, there is no need to make an appointment.
- If you just want to send him a written message, then do not use MS Teams or Blackboard to do this. Instead, please send it to his usual e-mail address, which is C.H.Bryant@salford.ac.uk.

2 How to Submit

You must submit your assessment through Blackboard. It is your responsibility to ensure that your work is submitted successfully to the correct folder and that the correct version has been submitted. If you find that you have submitted the wrong version, you can contact the Digital IT Service Desk before the submission deadline. They will be able to withdraw an incorrect submission, enabling you to make a new submission. Once the submission deadline has passed, no further action can be taken and work which has been submitted cannot be withdrawn. You can find the contact details of the Digital IT Service Desk in Chapter 2 of the module's exercise booklet.

3 Instructions

This is an individual coursework. You must **not** work in a team. The whole of your submission must be your own work. You are reminded that penalties will be applied to late submissions, in accordance with the regulations and policies.

Throughout this coursework, you must use the syntax, semantics, and grammar of proposition logic; and the layout and style of formal proofs presented during the classes.

4 Task Details

4.1 A Contradiction and a Tautology

- Demonstrate that $(p \Rightarrow q) \wedge (p \wedge \neg q)$ is a contradiction by drawing a truth table.
- Demonstrate that $(p \wedge \neg q) \Rightarrow \neg (\neg p \wedge q)$ is a tautology by writing a transformation proof. Every step of your proof must be fully annotated and apply just one law of logic.

4.2 Solar-powered Smart-car

A document concerning a solar-powered smart-car contains the following sentences.

- If a misalignment of the solar panels implies a shortage of power then there will be a delay to the journey.
- A misalignment of the solar panels prevents the electronics in the car from functioning and delays the journey.
- If the car battery is flat (fully drained) or the journey is delayed then the car will suffer a power shortage.

Taking these as axioms, provide a formal, deductive proof of the validity of the following conclusion.

- There is a delay to the journey.

Every step of your proof must be numbered and fully annotated.

4.3 Binary Logical Connectives

During the lectures, binary logical connectives were defined, such as $\wedge$ $\vee$ $\Rightarrow$ and $\Leftrightarrow$. Write a discussion on binary logical connectives which address the following questions.

- Are there any others that might be useful?

- How many such connectives can there be?
- Comment on whether the other connectives are useful.
- Why are some of them not very useful?

Your discussion should include explanations and justifications.

5 Assessment Criteria, Page Limits and Penalties

The assessment criteria and marking grid can be found at the end of this document. You must submit a document which includes the following items.

1. Your student roll number, your User ID, the assessment's title, the module's title and the CRN. Please do not include your name because the University will mark assessments anonymously where this is possible. Student roll numbers usually comprise the @ symbol followed by eight digits. User IDs usually comprise three characters followed by three digits. MAXIMUM $\frac{1}{4}$ SIDE OF A4
2. A truth table for the contradiction and a transformational proof for the tautology. (30 marks) MAXIMUM 1 SIDE OF A4
3. A formalisation of the axioms about the car and a formal, deductive proof of the validity of the conclusion. (50 marks) MAXIMUM 2 SIDES OF A4
4. A discussion on binary logical connectives. (20 marks) MAXIMUM 1 SIDE OF A4
5. Your reflections on your approach to this assessment and what you have gained from it. MAXIMUM $\frac{1}{4}$ SIDE OF A4

- Each of the above items must appear in separate clearly labelled sections.
- The order of the sections must correspond to the order of the items shown above.
- Zero marks will be awarded for parts of your submission beyond the page limits.
- Your submission must be typed (rather than hand-written) in, at least, font size 12pt. Do not use the colours red or green anywhere in your submission.
- You must submit a **single document, in PDF format,** via Blackboard. Zero marks will be awarded for supplementary files or files in other formats. Do not submit a zip file.

- The name of your PDF file must include your student roll number and your User ID. Please do not include your name because the University will mark assessments anonymously where this is possible.
- Citations and references must conform to the APA 7^{th} (Harvard) style.

6 Equipment and Facilities

The only equipment and facilities required are those needed to prepare the document described in Section 5.

7 Workload

The module specification indicates that you should do 139 hours of independent study. Given that there were classes on propositional logic during four weeks of Semester 2, this suggests that you should have spent $\frac{4}{2\times11} \times 139 \approx 25$ hours independently studying propositional logic. If you attended the classes and studied propositional logic for a further 25 hours then then you should expect to spend up to 15 hours on this assessment.

8 Artificial Intelligence (AI) Tools

AI tools cannot be used, except where they are embedded in assistive technologies, such as immersive reading tools, grammar/language checking, speech to text, etc. When using such tools, please use University provided tools within the requirements of the University's ICT Acceptable Use Policy, and do not upload sensitive or personal information.

9 Feedback Arrangements

The University's aspiration is that you will receive marks and feedback within 15 **working** days of the submission deadline. A completed marking grid will be made available in Blackboard. An announcement will be made on Blackboard (and emailed to you) when feedback has been released.

10 Assessed Intended Learning Outcomes

This coursework assesses the student's ability to:

- apply AI concepts, terminology and processes;
- use techniques for knowledge representation and searching; and
- formulate problems in logic and use logical inference to reach sound conclusions.

11 Employability Skills to be Developed/Demonstrated

Skill	I	U	A	D
Communication		x	x	
Critical Thinking and Problem Solving		x	x	
Data Literacy				
Digital Literacy			x	
Industry Awareness				
Innovation and Creativity			x	x
Proactive Leadership				
Reflection and Life-Long Learning			x	
Self-management and Organisation			x	
Team Working				

I You will have been introduced to this skill.

U You will have developed an understanding of this skill in the context of your subject.

A You will be able to apply this skill in the context of your subject.

D You will have demonstrated an enhanced understanding and application of this skill in a wider context.

12 Academic Integrity and Referencing

Students are expected to learn and demonstrate skills associated with good academic conduct (academic integrity). Good academic conduct includes the use of clear and correct referencing of source materials. You can find out more about the skills which students need at

- https://www.salford.ac.uk/skills/academic-integrity-referencing;
- https://www.salford.ac.uk/skills/referencing.

Academic misconduct is an action which may give you an unfair advantage in your academic work. This includes plagiarism, asking someone else to write your assessment for you or taking notes into an exam. The University takes all forms of academic misconduct seriously.

13 Support Arrangements

There will be a verbal briefing on the contents of this document and some question and answer sessions during scheduled class times. You can obtain further support for this assessment by attending Dr Bryant's surgery. If you send Dr Bryant a query about this assessment via e-mail then he may respond by sending a message (via Blackboard) to all students taking this module so that all students can benefit from his answer.

Tips You can find more information about understanding your assessment brief and assessment tips for success at:
https://www.salford.ac.uk/skills/university-assessments.

Assessment Rules and Processes You can find information about assessment rules and processes in the Assessment Support module in Blackboard.

Develop your Academic and Digital Skills Find resources to help you develop your skills at http://www.salford.ac.uk/skills/.

Concerns about Studies or Progress If you have any concerns about your studies, contact your Academic Progress Review Tutor/Personal Tutor or your Student Progression Administrator (SPA).

AskUS Services The University offers a range of support services for students through AskUS, including Disability and Learner Support, Wellbeing and Counselling Services (see https://www.salford.ac.uk/askus).

Personal Mitigating Circumstances If personal mitigating circumstances (e.g. illness or other personal circumstances) may have affected your ability to complete this assessment, you can find more information about personal mitigating circumstances procedure at:
https://www.salford.ac.uk/askus/admin-essentials/personal-mitigating-circumstances
Independent advice about this process is available from the Students' Union Advice Centre (see https://www.salfordstudents.com/advice/centre).

14 In Year Retrieval Scheme

Your assessment is **not** eligible for in year retrieval.

15 Reassessment

If you fail this assessment, and are eligible for reassessment, you will be required to do the same assessment again. The re-sit submission deadline is 18^{th} July 2025.

For students with accepted personal mitigating circumstances for absence/non submission, this will be your replacement assessment attempt.

We know that having to undergo a reassessment can be challenging however support is available. Have a look at all the sources of support outlined earlier in this brief.

Assessment Criteria and Marking Grid

AI & Data Mining (CRN 34123, UMC G400 20077) Coursework Lecturer: Dr C.H. Bryant Semester 2 of 2024/2025

	90–100% Outstanding	80–89% Excellent	70–79% Very Good	60–69% Good	50–59% Fair	40–49% Adequate	30–39% Needs improvement	20–29% Needs significant revision	10–19% Needs substantial work	0–9% Needs substantial work
Truth table (10%)	All of the cells are correct.	All but 1 of the cells are correct.	Nearly all of the cells are correct.	Most of the cells are correct.	A majority of the cells are correct.	A minority of the cells are correct.	A small minority of the cells are correct.	Scarcely any of the cells are correct.	Almost none of the cells are correct.	None or no attempt.
Proof for tautology (20%)	All of the steps & comments are correct.	All but 1 of the steps & comments are correct.	Nearly all of the steps & comments are correct.	Most of the steps & comments are correct.	A majority of the steps & comments are correct.	A minority of the steps & comments are correct.	A small minority of the steps & comments are correct.	Scarcely any of the steps & comments are correct.	Almost none of the steps & comments are correct.	None or no attempt.
Formalisation for car (10%)	All of the formalisation is correct.	All but 1 minor detail of the formalisation is correct.	Nearly all of the formalisation is correct.	Most of the formalisation is correct.	A majority of the formalisation is correct.	A minority of the formalisation is correct.	A small minority of the formalisation is correct.	Scarcely any of the formalisation is correct.	Almost none of the formalisation is correct.	None or no attempt.
Proof for car (40%)	All of the steps & comments are correct.	All but 1 of the steps & comments are correct.	Nearly all of the steps & comments are correct.	Most of the steps & comments are correct.	A majority of the steps & comments are correct.	A minority of the steps & comments are correct.	A small minority of the steps & comments are correct.	Scarcely any of the steps & comments are correct.	Almost none of the steps & comments are correct.	None or no attempt.
Discussion on binary logical connectives (20%)	All of the pertinent issues are covered concisely and precisely.	All but 1 of the pertinent issues are covered concisely and precisely.	Nearly all of the pertinent issues are covered concisely and precisely.	Most of the pertinent issues are covered concisely and precisely.	A majority of the pertinent issues are covered concisely and precisely.	A minority of the pertinent issues are covered concisely and precisely.	A small minority of the pertinent issues are covered concisely and precisely.	Scarcely any of the pertinent issues are covered concisely and precisely.	Almost none of the pertinent issues are covered concisely and precisely.	None or no attempt.