# GEI1001 Computational Reasoning

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Hello!

My name is Neil Barton, and I am coordinating this module in Semester 2 of AY 2024/2025. You'll see lots of me, but also lots of Jonathan Sim who designed many of the videos for the module. I'm very excited to embark on this learning journey together with you!

**This module is by arts people for arts people like you and me!** The teaching team (including the TAs who are also undergraduate FASS majors) are very dedicated and we are very happy to help you learn. So don't be afraid to come to us if you find yourself struggling. We're here to help! :)

We're going to teach you computational ways of thinking so that you have one more strategy that you can use to solve problems. As we'll see, the computational way isn't always best. But it's another tool that you can leverage to your advantage. And like any good FASS person, we'll learn to critique uses of this tool. Together, we'll figure out how to take the best of our arts training and marry that with a computational way of problem-solving.

We want to develop professional skills in you, so we'll be teaching you how to use Microsoft Excel like a pro. You'll learn some coding and lucrative skills enough for an FASS/BES/PFM person to stand out from the other majors to get an internship or a job (and do it well). Many students in the past semesters have written to say that they secured internships/jobs partly on the basis of this module!

## 1. Module Description

Through a series of fun and engaging hands-on activities, this module aims to equip students with the ability to thoughtfully apply computational tools when solving complex real-world problems. In particular, this module aims to impart students with the ability to critically self-evaluate the way they apply these tools, and thus be able to reason effectively in a variety of contexts. They will learn to identify problems and design solutions, while also developing a critical awareness of the merits and limits of their methods, thereby empowering them to make better-informed decisions and to articulate the reasons for those decisions.

This module is meant **ONLY** for FASS/BES and PFM majors. Non-FASS/BES/PFM majors will not be accepted.

## 2. Syllabus

Lecture 1: Introduction to Computational Reasoning

Lecture 2: What's Going On and Why? Understanding the Situation and Identifying Problems Using Data Analysis

Lecture 3: How to Reason with Data

Lecture 4: Anyone Can Model: The Fundamentals of Modelling

Lecture 5: Social Network Analysis: What's Going on in the Neighbourhood?

Lecture 6: Greedy Methods: How to Solve Problems in a Fast and Systematic Manner

RECESS WEEK

Lecture 7: A Fun Introduction to Coding with VBA

Lecture 8: Let's Up Our VBA Game!


## 3. Teaching Modes

This course is taught in the blended-learning mode, i.e. lectures are in the form of pre-recorded online videos with interactive exercises, and tutorials will be conducted face-to-face on campus.

We know that computational things might be intimidating, and it can be a challenge to learn such a subject in the blended-learning mode. **Do know we're here to help you every step of the way!**

**If you have any questions about the course (admin matters, content, or assignment matters), or if you're struggling with the technical stuff, don't panic! Feel free to contact the GEI1001/GET1050 Teaching Team.**

Telegram Helpline Chatgroup: https://t.me/+zl_nVH_Dw104ZGI8

**Scan this QR code to join the Helpline:**

## 4. Workload

**Module workload is determined by the number of MCs, and NOT the level of the course.**

**As a skills module, do expect the same amount of workload as a typical level-1000 language course. If you are enrolled in this course, it is not recommended to overload for the semester.**

This is a Level 1000 4MC module, where the expected workload is defined as 10 hours per week.

The breakdown of the 10 hours is as follows: 2-1-0-3-4

- Lecture: 2 hours per week
- Tutorial: 1 hour per week (this official labelling is misleading as tutorials are once a fortnight, so tutorials are actually 2 hours long, conducted once every two weeks)
- Laboratory Work: 0 hours per week
- Assignments & Projects: 3 hours per week
- Preparation Work: 4 hours per week

## 5. Assessments

This module is 100% Continual Assessment. **There are no final examinations.**

(i) Pre-Tutorials: 15%
(ii) Tutorials Class Participation: 20%
(iii) Individual Assignments (Quizzes): 20%
(iv) Group Project: 35%
(v) Surveys: 10%

Pre-Tutorials (15%)
There are 3 pre-tutorial discussions throughout the semester. You need to do them as preparation before coming for tutorials. The pre-tutorials are designed to get you thinking about a particular issue pertaining to the tutorial.

Tutorial Class Participation (20%)
Tutorials are a platform for you to experiment and learn. It's a safe space where you'll engage in fun and thought-provoking activities with your group mates. It's ok to get things wrong. We won't be assessing the rightness/wrongness of an answer. We just want you to tinker around, learn, and have fun. It's in environments like this where learning is most effective. Talking is a given in tutorials. In this module, you are graded based on how much you actively help your group mates to learn or how much you actively seek help from them.

Individual Assignments (20%)
There will be short MCQ/short-answer quizzes for every week's lesson to help you put what you've learnt into practice. Individual assignments will cover materials in the lectures and tutorials. From time to time, there will also be surveys and peer evaluation of group members for the group project. These will count into the individual assignment marks as well.

Group Project (35%)
You will need to solve a simulated real-world problem, by first designing a classification model and then a method to solve an allocation problem. However, both the model and method will have their own flaws. It is your job to take your solution to the next level by patching the algorithm to make the solution fairer for others.

Surveys (10%)
There are three surveys designed to help us better understand your needs as a learner so that we can help you to learn more effectively. There's one at the start at the start, one in the middle, and one at the end of the semester.

# Course summary:

| Date | Details | Due |
|---|---|---|
| Week 3<br>Tue, 28 Jan 2025 | Quiz Lecture 1 Knowledge Checker Quiz | due by 10:01 |
| | Quiz Lecture 2 Knowledge Checker Quiz | due by 10:01 |
| | Quiz Pre-Course Survey (You get 5 marks for completing this survey!) | due by 10:01 |
| | Assignment Pre-Tutorial Discussion 1 - Excel Working Submission | due by 10:01 |
| | Assignment Pre-Tutorial Discussion 1 - Feedback in the Comments | due by 10:01 |
| Week 5<br>Wed, 12 Feb 2025 | Quiz Lecture 3 Knowledge Checker Quiz | due by 10:01 |
| | Quiz Lecture 4 Knowledge Checker Quiz | due by 10:01 |
| | Assignment Pre-Tutorial Discussion 2 - Document | due by 10:01 |
| | Assignment Pre-Tutorial Discussion 2 - Excel Working Submission | due by 10:01 |
| Recess week<br>Tue, 25 Feb 2025 | Quiz Lecture 5 Knowledge Checker Quiz | due by 10:01 |
| | Quiz Lecture 6 Knowledge Checker Quiz | due by 10:01 |

| Date | Details | Due |
|---|---|---|
| | NOTE: No Pre-Tutorial 3! | |
| Week 9<br>Tue, 19 Mar 2025 | Quiz Lecture 7 Knowledge Checker Quiz | due by 10:01 |
| | Quiz Lecture 8 Knowledge Checker Quiz | due by 10:01 |
| | Quiz Mid-Course Survey (20 marks) | due by 10:01 |
| | Assignment Group Project Midway Submission - Instructions & Worksheet Submission | due by 10:01 |
| | Assignment Group Project Midway Submission - Excel Submission | due by 10:01 |
| Week 10<br>Tue, 18 Mar 2025 | Assignment Pre-Tutorial Discussion 4 | due by 10:01 |
| Week 11<br>Tue, 1 Apr 2025 | Assignment Group Project Final Submission (Due Week 11, Tue 31 Oct, 10.01 AM) | due by 10:01 |
| | NOTE: No Pre-Tutorial 5! | |
| Week 13<br>Tue, 15 Apr 2025 | Quiz Peer Evaluation for Group Project Final Submission (5 marks) AND End of Course Survey (15 marks) | due by 10:01 |