



1. General Course Information

1.1 Course Details

| | |
|----------------------------|---------------------------|
| Course Code: | 1004GRC |
| Course Name: | Computing and Programming |
| Trimester: | Trimester 1, 2023 |
| Program: | Diploma of Engineering |
| Credit Points: | 10 |
| Course Coordinator: | Dr. Ali Mirjalili |
| Document modified: | 20/01/2023 |

Course Description

This course introduces students to common computer software packages and develops their computing skills. The course introduces students to basic data analysis and numerical modelling techniques, and prepares students to solve engineering problems using off-shelf computer packages and software. This course includes project-based learning involving laboratory measurement.

Assumed Knowledge

There are no prerequisites for this course

1.2 Teaching Team

Your teacher/s can be contacted via email as below:

You will also find their email in the Teacher's tile on your Course Site.

| Name | Email |
|------------------------|--|
| Dr. Seyedali Mirjalili | Ali.mirjalili@staff.griffithcollege.edu.au |

1.3 Meet with your teacher

Your teacher is available each week to meet outside of normal class times. This is called consultation. Times that your teacher will be available for consultation will be found on the Teacher's tile on your Course Site.

1.4 Timetable

Your timetable is available on the Griffith College Digital Campus at My Apps, Timetable.

1.5 Technical Specifications

All students must have access to a computer or suitable mobile device such as laptop or tablet (mobile phones are not suitable). In addition, up-to-date browser access, a reliable high-speed internet connection with enough upload and download capacity, a webcam and headset including microphone are needed.

2. Aims, Outcomes & Generic Skills

2.1 Course Aims

The computer has become one of the most widely used tools in the modern world, and has profound impact on how engineering and science are practiced today. The goal of this course is to familiarise students with the software environment in a modern computing system, and to introduce the fundamentals of computing that apply to a programming languages, to solve various engineering problems.

This is one of the foundation courses required by other courses later in the Bachelor of Engineering (Honours) in Civil, Mechanical and Environmental majors where numerical computing become an integral part of the simulation/design methodology. This course develops fundamental skills in problem conceptualization, formulation, and solution in one of the most powerful and versatile programming environments - Python.



2.2 Learning Outcomes

After successfully completing this course you should be able to:

1. Acquire numerical computing skills using platform suitable for solving engineering problems.
2. Formulate engineering problem statement, identifying assumptions and simplifications, and translate them to computer problems.
3. Develop computer programs to solve fundamental problems, validate the program and evaluate its accuracy.
4. Analyse the results from engineering perspectives, such as for the engineering design or decision-making.
5. Develop the capacity to collaborate with team members effectively, and report and present engineering outcomes in a professional format.



2.3 Graduate Capabilities and Employability Skills

For further details on the Graduate Capabilities and Employability Skills please refer to the [Graduate Generic Skills and Abilities Policy](#)

Griffith College is committed to producing graduates who are able to demonstrate progress toward the development of a number of generic skills / capabilities that will allow them to successfully continue their studies at the tertiary level. This set of skills includes employability related skills that will ensure graduates are capable in the workplace of the future.

Studies in this course will give you opportunities to begin to develop the following skills:

| Graduate Capabilities and Employability Skills | | | Focus within this course |
|--|-----------------------------------|--|--------------------------|
| Interacting with People | Teamwork | | |
| | Communication | | ✓ |
| | Respect for Culture and Diversity | | |
| Readiness for the Workplace | Problem Solving | | ✓ |
| | Planning and Organisation | | ✓ |
| | Creativity and Future Thinking | | ✓ |



3. Learning Resources

3.1 Required Learning Resources

- Tony Gaddis, Starting Out with Python, 2021.
- Python documentation: <https://www.python.org/doc/>
- Math libraries: <https://docs.python.org/3/library/math.html>
- NumPy user guide: <https://numpy.org/doc/stable/user/index.html>
- Matplotlib 3.5.2 documentation: <https://matplotlib.org/stable/index.html>

3.2 Recommended Learning Resources

- David Schneider Introduction to Programming Using Python, Student Value Edition, 2015
- Please refer to the course webpage for other learning resources.

3.3 College Support Services and Learning Resources

Griffith College provides many facilities and support services to assist students in their studies. Links to information about support resources that are available to students are included below for easy reference.

- [Digital Library](#) – Databases to which Griffith College students have access to through the Griffith Library Databases.
- [Study Toolbox](#) – there is a dedicated website for this course on the Griffith College Digital Campus.
- [Academic Integrity](#) - Griffith College is committed to ensuring academic integrity is understood and maintained by all staff and students. All students learn about academic integrity through engagement with Academic Integrity online modules within the Academic and Professional Studies course.
- [Services and Support](#) provides a range of services to support students throughout their studies including academic advice and assignment help from Student Learning Advisors, and personal and welfare support from Student Counsellors.
- [Jobs and Employment](#) in the Student Hub can assist students with career direction, resume and interview preparation, job search tips, and more.
- [IT Support](#) provides details of accessing support, information on s numbers and internet access and computer lab rules.

3.4 Other Information about your Learning

Preparation and Participation in Learning

You need to prepare before attending your scheduled Learning Experience (In Class). Work through the Learning Content (Before Class) prepared by your teacher which is found on the course site. Make sure you complete the Learning Activities (After Class) set each week. Active participation in your learning will enhance your success. Ask questions when something is unclear or when you want to bring some issue to your teacher's attention; respond to questions to test your knowledge and engage in discussion to help yourself and others learn.

Attendance

You are expected to actively engage in all learning experiences which underpin the learning content in this course. You are expected to engage with the learning content and learning activities outside of timetabled class times. This requires you to be an active agent of your learning. You are expected to bring all necessary learning resources to class such as the required textbook and /or Workbook. In addition, you are encouraged to BYOD (bring your own device) to class such as a laptop or tablet. This is not a requirement as computer lab facilities are available on campus, however, the use of such devices in the classroom is encouraged with appropriate and considerate use principles being a priority.

Consultation Sessions

Teachers offer extra time each week to assist students outside the classroom. This is known as 'consultation time.' You may seek assistance from your teacher on email or in person according to how the teacher has explained this to the class. Attendance during consultation time is optional but you are encouraged to use this extra help to improve your learning outcomes.

Course Learning Materials

Learning materials are made available to you in the course site. The learning materials are arranged in Modules. In each Module you will find Learning Content (Before Class), Learning Experiences (In Class) and Learning Activities (After Class). **Learning Content (Before Class)** will be engaged with prior to the scheduled **Learning Experience (In Class)**. This will ensure you are prepared for the scheduled Learning Experience (In Class) by being aware of the content to be covered and therefore will be able to actively participate in the session. **Learning Activities (After Class)** are accessed after the scheduled session for purposes of review, consolidation of learning, and preparation for the Evidence of Learning Tasks (Assessments) in the course.

In addition, **Missed Class** learning material is provided in the course, providing support, interactive tools and directions for students who occasionally cannot attend the weekly scheduled Learning Experience (In Class, either in person or on Zoom) perhaps due to illness or other commitments. The Missed Class learning material should also be used in conjunction with Learning Content (Before Class) and Learning Activities (After Class) resources.

Self-Directed Learning

You will be expected to learn independently. This means you must organise and engage with the course Learning Content (Before Class) even when you are not specifically asked to do so by your teacher. The weekly guide (below) will be helpful to organise your learning. This involves revising the weekly Learning Content (Before Class) and completing the Learning Activities (After Class). It also means you will need to find additional information to evidence your learning beyond that given to you, and to construct your own response to a question or topic. All of this requires careful planning of your time. Expect to spend, on average, at least 10 hours per week including class time for each of your courses.

Program Progression

You are reminded that satisfactory Program Progression requires that attendance in classes is maintained at equal to or greater than 80%, students are engaged in their learning and that GPA is maintained at equal to or greater than 3.5 [please see Griffith College Policy Library - [Program Progression Policy](#) - for more information].

Teacher and Course Evaluation






Your feedback is respected and valued by your teachers. You are encouraged to provide your thoughts on the course and teaching, both positive and critical, directly to your teacher or by completing course and teacher evaluations via Griffith College's evaluation tool whenever these are available.



4. Weekly Guide: Learning Content, Learning Experiences and Learning Activities

The information below lays out how your learning will be organised throughout the trimester.

4.1 Modules for Learning and Weekly Learning Content, Learning Experiences and Learning Activities

| Week | Learning Content (Before Class) | Learning Experiences (In Class) | Learning Activities (After Class) | Evidence of Learning (Assessment) | Learning Outcome |
|--|---|---|---|---|---|
| |  |  |  |  |  |
| Module 1: Introduction to calculation and programming in Python | | | | | |
| 1 | Overview of computing and programming basics Basics and simple problem solving | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> Online tutorial Online workshop Discussion forum | | 1 |
| 2 | Data manipulation and management Matrices and data manipulation | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> Online tutorial Online workshop Discussion forum | Weekly activities | 1,2 |
| 3 | Programming logic and selection structure | Weekly activity Online programming game/tutorial Knowledge-check quiz | <ul style="list-style-type: none"> Online tutorial Online Workshop Discussion forum | Weekly activities | 1,2,3 |
| Module 2: Structured statements and matrices in Python | | | | | |
| 4 | Repetition structure and numerical integration Plotting | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> Online tutorial Online workshop Discussion forum | Weekly activities Quiz 1 | 1,2,3,4 |
| 5 | Selection and repetition structures Plotting | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> Online tutorial Online workshop Discussion forum | Weekly activities | 1,2,3,4 |
| 6 | Repetition structure and advanced problem solving | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> Online tutorial Online Workshop Discussion forum | Weekly activities Quiz 2 | 1,2,3,4 |
| 7 | Matrix Algebra | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> Online tutorial Online Workshop Discussion forum | Weekly activities | 1,2,3,4,5 |
| 8 | User defined functions | Weekly activity Online programming game/tutorial Knowledge-check quiz | <ul style="list-style-type: none"> Online tutorial Online Workshop Discussion forum | Weekly activities | 1,2,3,4 |

| Module 3: data analysis and advanced problem solving in Python | | | | | |
|---|--|---|---|----------------------------------|-----------|
| 9 | Analysing data statistically 1 | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> ● Online tutorial ● Online ● Workshop ● Discussion forum | Weekly activities | 1,2,3,4 |
| 10 | Analysing data statistically 2 Curve fitting for engineering analysis | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> ● Online tutorial ● Online ● Workshop ● Discussion forum | Weekly activities In-lab test | 1,2,3,4,5 |
| 11 | Advanced engineering problem solving Differential Equations | Weekly activity Online programming game/tutorial | <ul style="list-style-type: none"> ● Online tutorial ● Online ● Workshop ● Discussion forum | Weekly activities | 1,2,3,4 |
| 12 | Advanced topics and Revision | Weekly activity Online programming game/tutorial Knowledge-check quiz | <ul style="list-style-type: none"> ● Online tutorial ● Online ● Workshop ● Discussion forum | | 1,2,3,4 |

4.2. Practical Laboratory Classes

Practical laboratory classes commence in Week 2 and are delivered every week until Week 10. Topics are detailed in 4.1 Learning Experience Simulation Laboratory sessions. Please look out for the timetable details.



5. Evidence of Learning (Assessment)

5.1 Evidence of Learning Summary

| | Evidence of Learning (Assessment) | Weighting | Learning Outcome | Due Date |
|---|--|-----------|------------------|----------------------------|
| | | | | |
| 1 | Academic development holistic assessment Computer exercise attendance & practice (x9) | 18% | 1, 2, 3,4 | Weeks 2-6, 8, 9, 11 and 12 |
| 2 | Quiz 1 | 7% | 1,2 | Week 4 |
| 3 | Quiz 2 | 10% | 1,2 | Week 7 |
| 4 | Academic development holistic assessment In-lab test | 20% | 2,3 | Week 10 |
| 5 | Exam - selected and constructed responses Final Exam | 45% | 1, 2,3 | Week 13 |

5.2 Evidence of Learning Task Detail

Please note that web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for assessment creation, translation, or extensive language assistance purposes. Wikipedia, and Baidu, Weibo and WeTalk are not permitted to be used.

1. Evidence of Learning Task 1: Computer exercise attendance & practice (18%)

Task Type: Academic development holistic assessment

Learning Outcomes Assessed: 1, 2, 3, 4

Due Date: at the end of each computer exercise session (9x).

Weight: 18%, Marked out of: 18

Task Description: The computer exercise sessions are designed to introduce students to the fundamentals of the programming language as well as familiarise them with all computing skills, and provide the necessary scaffolding for the design projects including problem formulations and model validations from simple to more complicated civil/environmental engineering problems. The completed work will be submitted online for assessment. There are 9 sessions (**Weeks 2-6, 8, 9, 11 and 12**) in total. **Week 10 lab session will be in lab test.** Please note that web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for assessment creation, translation, or extensive language assistance purposes. Wikipedia, and Baidu, Weibo and WeTalk are not permitted to be used.

Criteria & Marking: Attendance and effort at each enrolled laboratory session. High quality and correct algorithm design to solve assigned problems. Students can receive feedback (within two weeks) on their assessment items through the labs, or by arranging an appointment with the appropriate teaching staff. Any such request must be arranged before the final examination.

Submission: Submit online at the end of each computer lab.

This assessment item:

- is a school based activity
- is an individual activity

- does not include a self assessment activity

2. Evidence of Learning Task 2: Quiz 1 (7%)

Task Type: Quiz 1

Learning Outcomes Assessed: 1, 2

Due Date: Week 4 online - 20 min

Weight: 10%, Marked out of: 20

Task Description: The online quiz is an early assessment to examine students' learning on their programming skills. The quiz includes 10 multiple-choice questions randomly selected from online test pools. The quiz will be open-book and conducted online with a given due date in Week 6. This test has a time limit of 20 minutes. Students can attempt the quiz from any internet enabled computer. Please note that web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for assessment creation, translation, or extensive language assistance purposes. Wikipedia, and Baidu, Weibo and WeTalk are not permitted to be used.

Criteria & Marking: Correct syntax; Correct analysis of sections of code; Correct and efficient logic and functionality of written algorithm code. Marks for each attempt are shown immediately upon submission. The best mark out of all attempts for each quiz will be used to calculate the overall mark for this assessment item. Extension, and late and deferred attempts are not allowed.

Submission: Online test administered via Griffith College portal. Students can receive feedback (within two weeks) on their assessment items through the labs, or by arranging an appointment with the appropriate teaching staff. Any such request must be arranged before the final examination.

Re-attempt: Students will be allowed to attempt the quiz three times before due date noting that each attempt will generate a new random set of questions.

This assessment item:

- is a school based activity
- is an individual activity
- does not include a self assessment activity
- may be available for re-assessment (see conditions outlined under Re-attempt above)

3. Evidence of Learning Task 3: Quiz 2 (10%)

Task Type: Academic development holistic assessment

Learning Outcomes Assessed: 2, 3

Due Date: Week 6 – 20 mins

Weight: 20%, Marked out of: 100

Task Description: The laboratory quiz will be held during students' **enrolled lab sessions in Week 10**.

Attendance at these quizzes is therefore compulsory. No deferred test will be offered.

The test requires students to work individually to apply their newly acquired programming and problem solving skills to (i) formulate the problem (ii) develop the algorithm (iii) develop the codes (iv) complete the model and analyse the results (v) make engineering decisions. The deliverables include the codes and flow charts.

The codes and the flow charts will be submitted for examination. Further details on the assessment are available on Griffith College Portal. Please note that web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for assessment creation, translation, or extensive language assistance purposes. Wikipedia, and Baidu, Weibo and WeTalk are not permitted to be used.

Criteria & Marking: Accuracy of the Work Undertaken: including analysis, critical review of results and outcomes and the testing and/or validation of the program.

Correct and efficient logic and functionality of written algorithm code.

Resubmission of project assignments is not permitted for this course.

Students can receive feedback (within two weeks).

Submission: Online in the Griffith College portal

This assessment item:

- is a school based activity
- is an individual activity
- does not include a self assessment activity

4. Evidence of Learning Task 4: In-lab test (20%)

Task Type: Academic development holistic assessment

Learning Outcomes Assessed: 2, 3

Due Date: Week 10 in class

Weight: 20%, Marked out of: 100

Task Description: The laboratory quiz will be held during students' **enrolled lab sessions in Week 10**.

Attendance at these quizzes is therefore compulsory. No deferred test will be offered.

The test requires students to work individually to apply their newly acquired programming and problem solving skills to (i) formulate the problem (ii) develop the algorithm (iii) develop the codes (iv) complete the model and analyse the results (v) make engineering decisions. The deliverables include the codes and flow charts.

The codes and the flow charts will be submitted for examination. Further details on the assessment are available on Griffith College portal. Please note that web applications such as ChatGPT, Google Translate, Grammarly and

Youdao (or equivalent services) are not permitted for assessment creation, translation, or extensive language assistance purposes. Wikipedia, and Baidu, Weibo and WeTalk are not permitted to be used.

Criteria & Marking: Accuracy of the Work Undertaken: including analysis, critical review of results and outcomes and the testing and/or validation of the program.

Correct and efficient logic and functionality of written algorithm code.

Resubmission of project assignments is not permitted for this course.

Students can receive feedback (within two weeks).

Submission: In Person at the Griffith College.

This assessment item:

- is a school based activity
- is an individual activity
- does not include a self assessment activity

5. Evidence of Learning Task 5: Final Exam (45%)

Task Type: Exam - selected and constructed responses

Learning Outcomes Assessed: 1, 2, 3

Due Date: Examination Period

Weight: 45%, Marked out of: 100

Perusal: 10 minutes

Duration: 120 minutes

Exam Type: Closed Book

Exam Format: On Campus

Task Description: The final examination will assess students on their fluency of the programming and computing skills; as well as their competency in writing simple programs and algorithms to achieve the specified outcomes.

Please note that web applications such as ChatGPT, Google Translate, Grammarly and Youdao (or equivalent services) are not permitted for assessment creation, translation, or extensive language assistance purposes. Wikipedia, and Baidu, Weibo and WeTalk are not permitted to be used.

Criteria & Marking: Correct syntax; Correct analysis of sections of code; Correct and efficient logic and functionality of written algorithm code.

Other Important Information on Assessment To be eligible to receive a grade of 4 or better for the course, the student must: 1) achieve an aggregate mark of at least 50% overall 2) achieve at least 40% for the final exam. Exam feedback provided upon request. To get feedback students will need to make an appointment with the course convenor.

This assessment item:

- is a centrally organised activity
- is an individual activity
- does not include a self assessment activity
- contains a mandatory pass component

In order to pass this Course, students must:

A. demonstrate assurance of learning of all learning outcomes through graded Evidence of Learning Tasks.

B. achieve an overall pass mark for this course,

6. Submit the assessment task: Final Exam, and

7. Achieve a minimum percentage mark of 40% [min 40 out of 100 for 'Final Exam'].

5.3 Late Submission

An Evidence of Learning Task submitted after the due date, without an approved extension from the teacher, will be penalised. The standard penalty is the reduction of the mark allocated to the Evidence of Learning Task by 5% of the maximum mark applicable for the Evidence of Learning Task, for each calendar day that the task is late. Evidence of learning tasks submitted more than seven calendar days after the due date are awarded zero marks.

Please refer to the Griffith College website - Policy Library > [Assessment Policy](#) for guidelines and penalties for late submission.

5.4 Other Information about Evidence of Learning

Retention of Originals

You must be able to produce a copy of all work submitted if so requested. Copies should be retained until after the release of final results for the Course.

Requests for extension

To apply for an extension of time for an evidence of learning task, you must submit an [Application for Extension of Assignment](#) form to your teacher at least 24 hours before the date the assignment is due. Grounds for extensions are usually: serious illness, accident, disability, bereavement or other compassionate circumstances and must be able to be substantiated with relevant documentation [e.g. [Griffith College Student Medical Certificate](#)]. Please refer to the Griffith College website – [Policy Library](#) for guidelines regarding extensions and deferred Evidence of Learning Tasks.

Return of Evidence of Learning Tasks

1. Marks awarded for in-trimester evidence of learning tasks, except those being moderated externally with Griffith University, will be available on the course site within fourteen [14] days of the due date. This does not apply to the final evidence of learning task in this course (marks for this task will be provided with the final course result).
2. Students will be advised of their final grade through the Digital Campus. Students can review their final exam papers after student grades have been published. Review of final exam papers will not be permitted after the final date to enrol.
3. Marks for **all** evidence of learning tasks including the final exam (if applicable) will be recorded in the Course Site and made available to students through the Course Site.

The sum of your marks of evidence of learning tasks in this course does not necessarily imply your final grade for the course. Standard grade cut off scores can be varied for particular courses, so you need to wait for the official release of grades to be sure of your grade for this course.

6. Policies & Guidelines

Griffith College Evidence of Learning Tasks-related policies can be found in the [Griffith College Policy Library](#) which include the following policies:

[Assessment Policy](#), [Special Consideration](#), [Deferred Assessment](#), [Alternate Exam Sittings](#), [Medical Certificates](#), [Academic Integrity](#), [Finalisation of Results](#), [Review of Marks](#), [Moderation of Assessment](#), [Turn-it-in Software Use](#). These policies can be accessed within the [Policy Library](#)

Academic Integrity Griffith College is committed to maintaining high academic standards to protect the value of its qualifications. Academic integrity means acting with the values of honesty, trust, fairness, respect and responsibility in learning, teaching and research. It is important for students, teachers, researchers and all staff to act in an honest way, be responsible for their actions, and show fairness in every part of their work. Academic integrity is important for an individual's and the College's reputation.

All staff and students of the College are responsible for academic integrity. As a student, you are expected to conduct your studies honestly, ethically and in accordance with accepted standards of academic conduct. Any form of academic conduct that is contrary to these standards is considered a breach of academic integrity and is unacceptable.

Some students deliberately breach academic integrity standards with intent to deceive. This conscious, pre-meditated form of cheating is considered to be one of the most serious forms of fraudulent academic behaviour, for which the College has zero tolerance and for which penalties, including exclusion from the College, will be applied.

However, Griffith College also recognises many students breach academic integrity standards without intent to deceive. In these cases, students may be required to undertake additional educational activities to remediate their behaviour and may also be provided appropriate advice by academic staff.

As you undertake your studies at Griffith College, your teachers and academic advisors will provide you with guidance to understand and maintain academic integrity; however, it is also your responsibility to seek out guidance if and when you are unsure about appropriate academic conduct.

In the case of an allegation of a breach of academic integrity being made against a student he or she may request the guidance and support of a Griffith College Student Learning Advisor or Student Counsellor.

Please ensure that you are familiar with the Griffith College Academic Integrity Policy; this policy provides an overview of some of the behaviours that are considered breaches of academic integrity, as well as the penalties and processes involved when a breach is identified.

For further information please refer to the Griffith College website - Policy Library > [Academic Integrity Policy](#)

Reasonable Adjustments for Evidence of Learning Tasks – The Disability Services policy

The [Disability Services policy](#) (accessed within the [Policy Library](#)) outlines the principles and processes that guide the College in making reasonable adjustments to Evidence of Learning Tasks for students with disabilities while maintaining academic robustness of its programs.

Risk Assessment Statement

This course follows Griffith College and Griffith University Workplace Health and Safety Laboratory guidelines.

The aim of workplace health and safety is to make sure that people do not get sick or injured at the workplace. The legislation dealing with this in Queensland is called the Workplace Health and Safety Act, 1995. Anyone who can affect workplace health and safety has an obligation under this Act.

As a student, you have an obligation to yourself and others to undertake activities in a safe manner. You must follow instructions which are provided for safety. You must not put yourself or anyone else at risk. Care especially needs to be taken when you are performing activities which can affect others. Additional Laboratory Rules if applicable will be available on the course site via the Griffith College Digital Campus.

It is imperative that students follow all health and safety procedures & clinical nursing guidelines, as well as any staff instructions given whilst in the lab.