ELEC07092
Programming with Python

Module Description
Python is an interpreted, high-level programming language, with a wide range of applications. This module introduces the Python programming language and environment, the Python standard library and some common Python libraries, with particular emphasis on data analysis applications. The module emphasises both principles and practice, technical and soft skills, and uses professional tools.

Learning Outcomes
On completion of this module the learner will/should be able to:
1. Develop Python code, incorporating fundamental programming principles and techniques.
2. Select, use and test a range of standard Python language features and common libraries, using professional development tools.
3. Apply software engineering principles in Python.
4. Design and debug code to address unforeseen tasks.
5. Select and use Python modules in data analysis applications.
6. Display an appreciation of good programming practice, style and ethics.

Indicative Syllabus
- Introduction to the Python ecosystem, including versions, common distributions & resources.
- Working in a Python development environment, for example using the latest Anaconda distribution.
- Introduction to Python syntax, and fundamental programming techniques including data, loops, control, functions, objects.
- Developing and debugging Python programs, starting with instructor-led examples, and working towards applying learning to unforeseen tasks.
- Importing and using common modules for general applications.
- Application of widely-used Python libraries for data science, for example NumPy, PANDAS, SciPy, Matplotlib.
- Consideration of good programming practice and programming style.
- Consideration of programming ethics.

Teaching and Learning Strategy
The teaching and learning strategy promotes deep learning with active learning practice. There is an emphasis on principles and underlying meanings, and in applying knowledge in new and different contexts. Laboratory and practical work with authentic exercises develops transferable skills, using industry standard tools and techniques. Independent learning is encouraged and a collaborative learning environment is fostered throughout.

Assessment Strategy
Assessment is continuous assessment based, and comprises a number of different elements. These include formative and summative quiz style assessments, Python related assignments and formative and summative practical coding exams. A variety of questions styles are used to target the module learning outcomes. Rubrics are used with assignments and exams.
Repeat Assessment Strategies

Students can repeat the module in the Autumn session, usually by taking a repeat practical coding exam.

### Indicative Coursework and Continuous Assessment:

<table>
<thead>
<tr>
<th>Form</th>
<th>Title</th>
<th>Percent</th>
<th>Week (Indicative)</th>
<th>Learning Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assignment</td>
<td>Quiz</td>
<td>30 %</td>
<td>Week 6</td>
<td>1,2,3,4,5,6</td>
</tr>
<tr>
<td>Assessment</td>
<td>Quiz</td>
<td>35 %</td>
<td>Week 10</td>
<td>1,2,3,4,5,6</td>
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<tr>
<td>Assessment</td>
<td>Coding Exam</td>
<td>35 %</td>
<td>End of Semester</td>
<td>1,2,3,4,5,6</td>
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### Blended Delivery Mode Average Weekly Workload:

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
<th>Location</th>
<th>Hours</th>
<th>Frequency</th>
<th>Weekly Avg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practical</td>
<td>Laboratory</td>
<td>Engineering Laboratory</td>
<td>2</td>
<td>Fortnightly</td>
<td>1.00</td>
</tr>
<tr>
<td>Lecture</td>
<td>Lecture</td>
<td>Online</td>
<td>1</td>
<td>Weekly</td>
<td>1.00</td>
</tr>
</tbody>
</table>

### Recommended Reading Book List


### Literary Resources

To follow.

### Online Resources

https://www.python.org/

### Other Resources

Other resources are available through the module's Moodle site.

### Programme Membership

GA_EAURG_B07 202000 Bachelor of Engineering in Automation & Robotics
GA_ESOEG_B07 202000 Bachelor of Engineering in Software and Electronic Engineering
GA_ESOEG_H08 202000 Bachelor of Engineering (Honours) in Software and Electronic Engineering