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| OP_logo_H_cmyk |  | Bachelor of Information Technology |

Course Directive

IN710 Object Oriented System Development

Semester One, 2019

# Description

In this paper, students will develop language-independent skills in object oriented development for medium to large applications. Students will learn current best-practice methods and tools for the design and construction of enterprise systems through a combination of discussion of theoretical principles and extensive coding work. In 2019, the paper is taught using the Python programming language.

# Course Information

Credits 15 credits

Prerequisites IN610 (Programming 3) or IN628 (Programming 4)

If you have not passed one of these papers then you must obtain a waiver before attending the course.

# Lecturer

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| Name | Nathan Rountree |
| Role | Principal Lecturer |
| Location | D303a |
| Phone | 972-7447 |
| email | Nathan.Rountree@op.ac.nz |

# Course Dates

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| --- | --- |
| Term 1 (8 weeks) | 18 February – 12 April |
| Mid-semester break | 15 April – 26 April |
| Term 2 (8 weeks) | 29 April – 21 June |

# Learning Outcomes

At the completion of this paper, students will be able to:

1. Discuss theoretical and pragmatic issues surrounding design and implementation of enterprise software systems.
2. Analyse a problem statement for a complex software system and design an appropriate class architecture for the problem solution.
3. Design and implement components of large software systems following industry standard software engineering methodologies and producing industry-quality code.

# Indicative Content

1. Major object-oriented (GoF) design patterns and architectural approaches
2. Object-oriented features and idioms in Python
3. Relational databases and application-database connectivity
4. Python frameworks for full-stack applications (e.g. Django)
5. Intermediate/advanced computational techniques
6. Unit testing techniques, including stubbing
7. Debugging, exception handling and validation
8. Multi-threaded applications
9. Content representation including XML and JSON
10. Future directions in software development

# Resources

• **Software**

Installers for Visual Studio and SQL Server management Studio are available on the Software Page (https://secure.ict.op.ac.nz/msdnaa/). Please email Rob Broadley, or visit his office during his student consultation hours, if you have any problems getting the software. PyCharm is also available on the standard BIT desktop.

**• Textbook & Readings**

There is no required textbook for the course. The following are useful supplementary texts:

*Design Patterns: Elements of Reusable Object-Oriented Software*. Erich Gamma, Richard Helm, Ralph Johnson, and John Vlissides. Addison-Wesley, Boston, MA, (January 1995)

*Head First Design Patterns*. Eric Freeman, Elisabeth Robson, Bert Bates, Kathy Sierra, O’Reilly (2004).

Required readings will be provided as pdf files, or will be available online in the OP Safari collection. Access the collection at <http://proquestcombo.safaribooksonline.com/> from any OP machine, or via the ViewClient. All readings are examinable.

# Provisional Schedule

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| **Week** | **Class 1** | **Class 2** |
| 1 | Python and OO concepts | Using OO design |
| 2 | Design for reusability | Strategy pattern |
| 3 | Observer pattern | Decorator pattern |
| 4 | Frameworks, ORM, MVC 1 | Frameworks, ORM, MVC 2 |
| 5 | Frameworks, ORM, MVC 3 | Frameworks, ORM, MVC 4 |
| 6 | Automated testing 1 | Automated testing 2 |
| 7 | Exception handling | Serialization |
| 8 | Restful APIs 1 | Restful APIs 2 |
| Mid-semester break | | |
| 9 | Factory pattern | Singleton pattern |
| 10 | Parallelism (multithreading) | Exception handling |
| 11 | Event queues | Iterators and generators |
| 12 | Template method pattern | Adapter pattern |
| 13 | Mutability and immutability | Builder pattern and enumerations |
| 14 | Project work | Project work |
| 15 | Project showcase (code defense) | Project showcase (code defense) |
| 16 | Exam preparation | **Exam** |

# AssessmenT

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| Assessment | Weighting | Learning Outcomes |
| Practicals | 25% | 2,3 |
| Software Project | 45% | 2,3 |
| Theory Exam | 30% | 1,2 |

* Detailed assignment requirements, including instructions for submission, will be provided for each assessment.

# Course Requirements and Expectations

# Criteria for Passing

# To pass this paper, you must achieve an overall average of 50. There must be a genuine attempt at all assessments. There are no resits.

# Attendance

* Students are expected to attend all classes, both lectures and labs.
* If you miss a class you will need to get notes from another student.
* If you cannot attend for a few days for any reason, please contact your lecturer.
* You must turn up ready for assessments on the due date and at the correct time. No extra time will be scheduled. If you do not turn up, you have failed the assessment.

## Communication

Your student email is an official communication channel. It is your responsibility to regularly check your student email and Moodle for important course related material, including changes to class scheduling or assessment details. Not checking will not be accepted as an excuse.

You can manage your email at the Student Hub and download the instructions for forwarding your email at http://www.op.ac.nz/students/student-hub/

## Snow Days/Polytechnic Closure

In the event that the Polytechnic is closed or has a delayed opening because of snow or bad weather, you should not attempt to attend class if it is unsafe to do so. It is possible that your instructor will not be able to attend either, so classes will not physically be meeting. However, this does not become a holiday. Rather, material will be available on either Moodle of the I drive covering the material for classes affected by the closure. You are responsible for any material presented in this manner. Information about closure will be posted on the BIT and Otago Polytechnic Facebook pages <https://www.facebook.com/OtagoPoly>.

## Group work and originality

Students in the Bachelor of Information Technology degree are expected to hand in original work. Students are encouraged to discuss assignments with their fellow students, however, all assignments are to be completed as individual works unless group-work is ***explicitly*** required (i.e. if it doesn’t say it is group-work then it is not group-work – even if a group consultation was involved). Failure to submit your own original work will be treated as plagiarism.

## Referencing

Appropriate referencing is required for all work. Referencing standards will be specified by your lecturer.

## Plagiarism

Plagiarism is submitting someone else’s work as your own. Plagiarism offences are taken seriously and an assessment that has been plagiarised may be awarded a zero mark. A definition of plagiarism is in the Student Handbook, available online or at the School office.

## Submission requirements

All assignments are to be submitted by the time, date, and method given when the assignment is issued. Failure to meet all requirements may result in a penalty of up to 10% per day (including weekends).

## Extensions

Extensions are only available for unusual circumstances. These must be applied for, and approved, prior to the submission deadline.

## Impairment

In case of sickness contact your lecturer or year co-ordinator as soon as possible, preferably before the test or assignment is due. The policy regarding the granting of a mark that considers impaired performance requires a medical certificate and a medical practitioners signature on a form. You may should refer to the guide on impaired performance on the student handbook.

## Appeals

If you are concerned about any aspect of your assessment, please approach the lecturer in the first instance. We support an open door policy and aim to resolve issues promptly. Further support is available from Year Co-ordinators, Programme Manager and Head of School. Otago Polytechnic has a formal process for academic appeals if necessary.

# Other Documents

Regulatory documents relating this course can be found on the Polytechnic website.