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| **Minor Award Name** | Fundamentals of Object Orientated Programming |
| **Minor Award Code** | 5N0541 |
| **Level** | Level 5 |

**Suggested resources to support delivery:**

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| --- | --- | --- | --- | --- |
| **Theme/Topic** | **Type** | **Relevance** | **Author/Source** | **Web Link** |
| Programming fundamentals  (LO 2, 3) | e-book | This free online book, goes start to finish of a level 5 (and some level 6) object orientated programming concepts.  C# | Svetlin Nakov & Co.  Free Distribution  2013  Language : C# | <http://www.introprogramming.info/wp-content/uploads/2013/07/Books/CSharpEn/Fundamentals-of-Computer-Programming-with-CSharp-Nakov-eBook-v2013.pdf> |
| Programming fundamentals  (**e-book J**)  (LO 2,3) | e-book | This free online book, goes start to finish of a level 5 (and some level 6) object orientated programming concepts.  Java | David J. Eck  Free Online Book  2014  Language : Java | <http://math.hws.edu/javanotes/> |
| ***Note:*** *Due to a large selection of languages, Java is selected as the language from here on, The inclusion of the e-book for C# was based on the idea of cross referencing if required.*  *From here on, all examples and notes will either be from a section/ page in the* ***e-book J****, or web references based on the Java programming language.* | | | | |
| Object Orientated Concepts  (LO 2,3) | E-Doc | Oracle online Doc, that describes terms and purposes based on object orientated concepts | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/concepts/> |
| Object Orientated Concepts  (LO 2,3) | e-Book specific page | Methods, members, fields and functions | David J. Eck  Free Online Book  2014  Language : Java | <http://math.hws.edu/javanotes/c5/s1.html> |
| Object Orientated Concepts  (LO 2,3) | Website | Methods, members, fields and functions | Unknown | <http://www.java-made-easy.com/java-methods.html> |
| Object Orientated Concepts  (LO 2,3) | Website | Full definitions that cover constructors, encapsulation and inheritance. C# language used, but definitions apply to all object orientated languages. | Code project Definitions – contributor  Nirosh. | <http://www.codeproject.com/Articles/22769/Introduction-to-Object-Oriented-Programming-Concep> |
| Data Types  (LO 1) | e-book | Primitive data types | David J. Eck  Free Online Book  2014  Language : Java | <http://math.hws.edu/javanotes/c2/s2.html> |
| Data Types  (LO 1) | E Doc | Primitive data types | Oracle Doc on PDT | <https://docs.oracle.com/javase/tutorial/java/nutsandbolts/datatypes.html> |
| Data Types  (LO 1) | e-book | String data types (Basic Object data type) | David J. Eck  Free Online Book  2014  Language : Java | <http://math.hws.edu/javanotes/c2/s3.html> |
| Logical Operators( LO 1) | e-book | Logical Operators | David J. Eck  Free Online Book  2014 (Java) | <http://math.hws.edu/javanotes/c2/s5.html> |
| Logical Operators  (LO 1) | E Doc | Logical Operators | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/nutsandbolts/operators.html> |
| Boolean Logical Operators  (LO 1) | website | Boolean expression and truth table | Unknown | <http://www.freejavaguide.com/boolean_operators.htm> |
| Boolean Algebra  (LO 1) | PDF | Basic Boolean algebra to help describe results of logical operations. | UK educational institution | <http://www.doc.ic.ac.uk/~dfg/hardware/HardwareLecture01.pdf> |
| Enumeration  (LO 1) | website | Enumeration basic definition and standard days of the week example. | Unknown | <http://examples.javacodegeeks.com/java-basics/java-enumeration-example/> |
| Enumeration  (LO 1) | E Doc | Enumeration definition and examples in Java | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/javaOO/enum.html> |
| Arrays  (LO 1) | e-book | String data types (Basic Object data type) | David J. Eck  Free Online Book  2014  Language : Java | <https://docs.oracle.com/javase/tutorial/java/nutsandbolts/arrays.html> |
| Arrays  (LO 1) | Website | Basic tutorial on create array objects, filling and display array contents | Alvin Alexander | <http://alvinalexander.com/blog/post/java/java-faq-create-array-int-example-syntax> |
| Type Conversions  (LO 1) | E Doc | Complete set and examples of primitive data type conversions from one to another, first example is for float to int. | Oracle Doc | <https://docs.oracle.com/javase/specs/jls/se7/html/jls-5.html> |
| Introduction to Netbeans  (Java)  (LO 5) | Web tutorial | Learning outcome 5 is all about using an IDE, the first ide that is examined is Netbeans which is a highly regarding IDE, and free.  <https://netbeans.org/> | Netbeans | <https://netbeans.org/kb/docs/java/quickstart.html> |
| Introduction to Eclipse  (Java)  (LO 5) | Web tutorial | This tutorial explores the Eclipse IDE.  Eclipse IDE is freely available.  <https://eclipse.org/> | Eclipse | <http://www.tutorialspoint.com/eclipse/> |
| Introduction to Visual Studio Community Edition  (C#)  (LO 5) | Web tutorial | This tutorial explores the Visual Studio Community Edition 2015 IDE. This is a free version of Visual Studio, and students can use this freely.  <https://www.visualstudio.com/downloads/download-visual-studio-vs> | Visual Studio Community Edition 2015 | <https://msdn.microsoft.com/en-us/library/jj153219.aspx> |
| Software Design  (LO 4, 8, 11) | Web tutorial | This tutorial examines the UML technique to document an algorithm, using precise step by step instructions which will be used to code the algorithm later on. (This has very strong ties with Software Architecture module)  The free software that can be used to formally create these is  (UMLet)  Free at: <http://www.umlet.com/> | Unknown  UMLet Tutorial  UMLet examples and discussion | <http://www.tutorialspoint.com/uml/uml_activity_diagram.htm>  <https://www.youtube.com/watch?v=3UHZedDtr28>  <http://stackoverflow.com/questions/16546961/umlet-diagrams-like-use-case-class-activity-etc> |
| Objects  (LO 4, 8,11) | e-book | Classes and Instances of classes (Objects)  Building a single class and then calling an instance of this class, in the main method. | David J. Eck  Free Online Book  2014  Language : Java | <http://math.hws.edu/javanotes/c5/s1.html> |
| Objects  (LO 4, 8,11) | E Doc | Complete set and examples of creating a class, and then creating an instance of a class (an Object) in the main method. | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/javaOO/index.html> |
| Objects  (LO 4, 8,11) | Web tutorial | Very in depth tutorial, for creating an object with clear and simple definitions for all of the terms with examples to match each iteration. | Unknown | <http://www.tutorialspoint.com/java/java_object_classes.htm> |
| Outputs  (LO 4, 8,11) | e-book | Basic outputs using both static string data and variables. | David J. Eck  Free Online Book  2014 (Java) | <http://math.hws.edu/javanotes/c2/s4.html> |
| Outputs  (LO 4, 8,11) | E Doc | Complete set of examples for both outputs (System.out.print()) and formatting outputs. | Oracle Doc | <https://docs.oracle.com/javase/tutorial/essential/io/formatting.html> |
| Inputs  (LO 4, 8, 11) |  | Input of data (primitive and string), from the keyboard using java.util.scanner.  This is one of the most common approaches. | Unknown | <http://www.java-made-easy.com/java-scanner.html> |
| Inputs and Outputs | PDF | Complete online course for inputs and outputs, complete with examples. | Educational institution, read only | <http://courses.cs.washington.edu/courses/cse142/08au/lectures/2008-10-13_ch03-3/09-ch03-3-scanner.pdf> |
| Branching statements  (LO 4, 8, 11) | e-book | Branching statements, with examples, if, else if. | David J. Eck  Free Online Book  2014 (Java) | <http://math.hws.edu/javanotes/c3/s5.html> |
| Branching statements  (LO 4, 8, 11) | E Doc | Branching statements, with examples, if, else if. | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/nutsandbolts/if.html> |
| Branching statements  (LO 4, 8, 11) | Web tutorial | Java basic branching (If only) | Unknown | <http://www.homeandlearn.co.uk/java/java_if_statements.html> |
| Branching statements  (LO 4, 8, 11) | Web tutorial | Java basic branching (If and else if) | Unknown | <http://www.homeandlearn.co.uk/java/java_if_else_statements.html> |
| Iteration  (LO 4, 8, 11) | E Doc | Iteration using while and do while loops. | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/nutsandbolts/while.html> |
| Iteration  (LO 4, 8, 11) | E Doc | Iteration using for loops. | Oracle Doc | <https://docs.oracle.com/javase/tutorial/java/nutsandbolts/for.html> |
| Iteration  (LO 4, 8, 11) | e-book | Iteration using while and do while loops. | David J. Eck  Free Online Book  2014 (Java) | <http://math.hws.edu/javanotes/c3/s3.html> |
| Iteration  (LO 4, 8, 11) | e-book | Iteration using for loops. | David J. Eck  Free Online Book  2014 (Java) | <http://math.hws.edu/javanotes/c3/s4.html> |
| Iteration  (LO 4, 8, 11) | Web tutorial | Iteration using for loops. | Unknown | <http://www.homeandlearn.co.uk/java/java_for_loops.html> |
| PBL  (LO 4,5,6,7,8,10,11) | Journal Publication | The basics of Problem Based Learning (PBL), using the seven steps to break down a complex problem into smaller steps. | Esko Nuutila, Seppo To rma and Lauri Malmi | <http://www.cs.hut.fi/~janne/studio1/PBL_artikkeli.pdf> |
| PBL  (LO 4,5,6,7,8,10,11) | Journal Publication | The basics of Problem Based Learning (PBL), using the seven steps to break down a complex problem into smaller steps. | A Mooney and S Bergin | <http://eprints.maynoothuniversity.ie/726/1/PBLPaper2.pdf> |
| OOP Lab example | PDF | This lab is based in C++, but has many of the constructs required to show how to structure class questions in a lab.  Just for an example (it is geared higher than Level 5) |  | <http://www.srmuniv.ac.in/sites/default/files/files/Object%20Oriented%20Programming%20LAB.pdf> |
| Testing  (LO 9, 10) | Website | Detailed overview of test cases for formalising software testing | Unknown | <https://university.utest.com/test-case-writing-creation/> |
| Testing  (LO 9, 10) | Journal publication | What is a good test case, detailed analysis of this question with topics and headings to include in test case creation. | Cem Kaner, J.D., Ph.D | <http://www.kaner.com/pdfs/GoodTest.pdf> |

**Useful Organisations:**

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| **Name** | **Contact Information** |
| IEEE | <https://www.ieee.org/index.html> |
| Oracle | <http://www.oracle.com/index.html> |
| Microsoft | <https://www.visualstudio.com/en-ie> |
| FESS | [www.fess.ie](http://www.fess.ie) |
| NCCA | [www.ncca.ie](http://www.ncca.ie) |
| QQI | [www.qqi.ie](http://www.qqi.ie) |
| NITA | Contact FESS for details |
| Code.org | [www.code.org](http://www.code.org) |

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| **MOOCs (Massive Online Open Courses)** | |
| Free access to online courses | What is a MOOC?  <https://www.youtube.com/watch?v=eW3gMGqcZQc>  Java: <http://www.homeandlearn.co.uk/java/java.html>  List of MOOCS: <https://www.mooc-list.com/tags/java?static=true> |