

### Subject Description Form

<b>Subject Code</b>	HSS5308
<b>Subject Title</b>	Computer Programming for Healthcare
<b>Credit Value</b>	3
<b>Level</b>	5
<b>Pre-requisite / Co-requisite/ Exclusion</b>	This subject is designed for students with no computer programming background.
<b>Objectives</b>	To provide students from healthcare backgrounds with basic computer programming knowledge and the coding techniques in the context of healthcare; to enable the students to appreciate the software development process for healthcare and medical applications and facilitate them to participate in the process.
<b>Intended Learning Outcomes</b>	Upon completion of the subject, students will be able to: <ul style="list-style-type: none"> <li>a. Acquire basic computer programming concepts, skills and software development environments in the contexts of healthcare</li> <li>b. Understand the principles of working with datasets and databases in healthcare applications</li> <li>c. Acquire knowledge of healthcare data standards and data processing/ analysis techniques</li> <li>d. Appreciate the role of computer programming in healthcare and medical applications</li> </ul>
<b>Subject Synopsis/ Indicative Syllabus</b>	<ol style="list-style-type: none"> <li>1. Introduction to medical informatics programming: systems and applications, history and future trends, the role of programming in healthcare, introduction to programming languages and available tools, medical informatics resources.</li> <li>2. Basic computer skills and programming with focus on healthcare contexts: setting up programming environment, file operations, variables and functions, compiling and executing codes, conditional and control statements.</li> <li>3. Fundamental methods and algorithms in medical informatics: programming text files and image files, indexing, common utility scripts, pattern matching with regular expressions</li> <li>4. Medical data storage, data sources and standards: introduction to databases, creating and parsing XML data, resource description framework, working with messaging standards and vocabularies.</li> <li>5. Privacy and de-identification of medical data: hashing and scrubbing data</li> </ol>
<b>Teaching/Learning Methodology</b>	<p>Online learning:</p> <p>Online materials and video demonstration are provided to introduce the concepts and principles of healthcare programming; programming methodologies and techniques relevant to medicine and health care, system applications; and case studies of programming techniques.</p> <p>Online discussions / Tutorial:</p>

	Students are guided to discuss the applications of various programming skills and case studies of programming techniques; and work through examples to reinforce their understanding of the concepts and principles introduced by the online materials.						
<b>Assessment Methods in Alignment with Intended Learning Outcomes</b>	Specific assessment methods/tasks		% weighting	Intended subject learning outcomes to be assessed			
				a	b	c	d
	1. Test		50%	✓	✓	✓	✓
	2. Assignments		50%	✓		✓	✓
	Total		100 %				
<p>Written test:</p> <p>To assess students' level of understanding regarding the essential concepts of computer programming and the coding skills relevant to healthcare and medical applications.</p> <p>Assignment:</p> <p>To provide students with opportunities to learn and reinforce the essential computer programming concepts and principles by putting them into practice. Students are required to set up software development environments, apply the coding principles and techniques in the programming assignments, and to process and analyse medical data by developing software programmes and scripts. While the students are encouraged to discuss among each other through online discussions or face-to-face, they are required to work on the coding assignments independently to demonstrate their level of understanding and competency.</p>							
<b>Student Study Effort Required</b>	Class contact:						
	▪ Online learning					27 Hrs.	
	▪ Face-to-face (tutorials and discussions)					12 Hrs.	
	Other student study effort:						
	▪ Online tutorials and peer discussions					20 Hrs.	
	▪ Preparation for assignments					30 Hrs.	
	▪ Preparation for written test					30 Hrs.	
	Total student study effort					119 Hrs.	
<b>Reading List and References</b>	<ol style="list-style-type: none"> <li>1. Berman, J. Perl Programming for Medicine and Biology. Sudbury, MA: Jones and Bartlett Publishers, 2007.</li> <li>2. Kinser, J.M. Python for bioinformatics. Sudbury, MA: Jones and Bartlett Publishers, 2009.</li> <li>3. Model, M L. Bioinformatics programming using Python. Sebastopol, CA: O'Reilly, 2010.</li> </ol>						

	<ol style="list-style-type: none"><li>4. Matthe, E. Python Crash Course, 2nd Edition: A Hands-On, Project-Based Introduction to Programming, San Francisco, CA: No Starch Press, 2019.</li><li>5. Learnpython.org, <a href="https://www.learnpython.org/">https://www.learnpython.org/</a></li><li>6. W3Schools Online Web Tutorials, <a href="https://www.w3schools.com/python/default.asp">https://www.w3schools.com/python/default.asp</a></li><li>7. Regular Expression Tester, <a href="https://regexr.com/">https://regexr.com/</a></li><li>8. Interactive Tutorial on Regular Expressions, <a href="https://regexone.com/">https://regexone.com/</a></li><li>9. How to write regular expressions, Geeks for Geeks, (last updated: 8 Jul 2016) <a href="https://www.geeksforgeeks.org/write-regular-expressions/">https://www.geeksforgeeks.org/write-regular-expressions/</a></li></ol>
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