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| Course Unit Title | DISTRIBUTED AND CLOUD COMPUTING | | |
| Course Unit Code | WSS521 | | |
| Course Unit Details | MSc Web and Smart Systems (Required) - | | |
| Number of ECTS credits allocated | 10 | | |
| Learning Outcomes of the course unit | <p>By the end of the course, the students should be able to:</p> <ol style="list-style-type: none"> 1. To relate the cloud computing paradigm traditional models of computing such as parallel processing and distributed processing. 2. To demonstrate awareness on the different technologies that enable cloud computing. 3. To demonstrate competence in using Hadoop/MapReduce as a programming model for distributed processing of large datasets. 4. To implement different algorithms in the Hadoop/MapReduce platform 5. To evaluate the performance and identify bottlenecks when mapping applications to the cloud. 6. To demonstrate awareness of current issues related to cloud computing 7. To develop cloud applications using a cloud platform such as the Microsoft Azure. | | |
| Mode of Delivery | Face-to-face | | |
| Prerequisites | NONE | Co-requisites | NONE |
| Recommended optional program components | NONE | | |
| Course Contents | <p>Parallel Computing: Parallelization levels, parallel computer classification, memory architectures, system interconnects. Parallel programming models, parallel performance analysis.</p> <p>Distributed Systems: Comparison with parallel systems, distributed system design (hardware, software, service models), synchronization and memory consistency, distributed file system. Programming issues for distributed systems.</p> <p>Functional Programming: The MapReduce programming model and the Hadoop API and interface. Algorithm implementation in MapReduce and Hadoop.</p> <p>Cloud Computing: Cloud service models, virtualization, data storage, data processing and data centers. Management, auditing and security issues. Current trends in cloud computing. Overview of cloud computing platforms such as the Amazon EC2 and S3, Google AppEngine, and Microsoft Azure.</p> | | |
| Recommended and/or required reading: | | | |

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| Textbooks | <ul style="list-style-type: none"> • K. Hwang, G. Fox and J. Dongarra, Distributed and Cloud Computing: From Parallel Processing to the Internet-of-Things, Morgan Kaufmann Publishers, 2012 | | | | | | | | |
| References | <ul style="list-style-type: none"> • Tanenbaum and van Steen, Distributed Systems: Principles and Paradigms, Pearson, 2007. • Erl, Thomas, Puttini, Ricardo, and Mahmood, Zaigham (2013). Cloud Computing: Concepts, Technology & Architecture. Prentice Hall. • Relevant academic research papers. • Online reports, tutorials and videos | | | | | | | | |
| Planned learning activities and teaching methods | <p>The taught part of course is delivered to the students by means of lectures, conducted with the help of computer presentations. Lecture notes and presentations are available through the web for students to use in combination with the textbooks. Furthermore theoretical principles are explained by means of specific examples and solution to specific problems.</p> <p>Lectures are supplemented with unsupervised computer laboratory and homework where students apply their gained knowledge and identify the principles taught in the lecture sessions.</p> <p>The course will also utilize research paper analysis and presentation allowing students to gain knowledge on the state of the art on specific security topics.</p> | | | | | | | | |
| Assessment methods and criteria | <table> <tr> <td>Participation Activities</td> <td>10%</td> </tr> <tr> <td>Assessment activities</td> <td>15%</td> </tr> <tr> <td>One marked project</td> <td>15%</td> </tr> <tr> <td>Final Exam</td> <td>60%</td> </tr> </table> | Participation Activities | 10% | Assessment activities | 15% | One marked project | 15% | Final Exam | 60% |
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| One marked project | 15% | | | | | | | | |
| Final Exam | 60% | | | | | | | | |
| Language of instruction | English | | | | | | | | |
| Work placement(s) | NO | | | | | | | | |