

## CE4013 and CZ4013 – Distributed Systems

<b>Academic Year</b>	AY1819	<b>Semester</b>	2					
<b>Course Code</b>	CE/CZ4013							
<b>Course Title</b>	Distributed Systems							
<b>Pre-requisites</b>	CE/CZ2005 Operating System; CE3005 Computer Networks OR CZ3006 Net-Centric Computing							
<b>Pre-requisite for</b>	NIL							
<b>No of AUs</b>	3							
<b>Contact Hours</b>	Lectures	26	TEL	0	Tutorials	13		

### Course Aims

This course aims to develop your understanding of the basic architectures, algorithms and design principles of distributed computing systems, and how they meet the demands of contemporary distributed applications.

This course provides an introductory but broad perspective of distributed systems, and is relevant for anyone pursuing a career in the IT/ICT industry – including those in product design and development, network/system administration, as well as, given the proliferation of IT in all walks of our lives, in executive roles across industries and government.

### Intended Learning Outcomes (ILO)

This course introduces distributed systems at an elementary level. Upon the successful completion of this course, you shall be able to:

1. Explain the fundamental concepts and main features of distributed systems.
2. Describe the architectures of distributed systems.
3. Describe the functions of software components and common services to support distributed applications.
4. Analyse and apply the basic distributed algorithms.
5. Apply key design principles to an implementation of distributed system.

## CE4015 and CZ4015 – Simulation and Modelling

<b>Academic Year</b>	AY1819	<b>Semester</b>	2					
<b>Course Code</b>	CE/CZ4015							
<b>Course Title</b>	Simulation and Modelling							
<b>Pre-requisites</b>	CE/CZ1007 Data Structures; CE/CZ1011 Engineering Mathematics I							
<b>Pre-requisite for</b>	NIL							
<b>No of AUs</b>	3							
<b>Contact Hours</b>	Lectures	26	TEL	0	Tutorials	13	Laboratories	8

### Course Aims

Modelling and Simulation (M&S) course aims to equip you with one of the most important techniques to study real-time complex systems. M&S is an essential tool in many areas of science and engineering and has many applications, ranging from system analysis, decision support, to virtual environments. Thus, this course will introduce some fundamental techniques in M&S and build an understanding of the systems and tools of this field.

This course provides an introduction to system simulation and modelling techniques for complex dynamic systems. While the focus of this course is on how to analyze complex systems using computer simulation, some basic mathematical techniques will also be discussed. Various modelling, simulation and performance analysis techniques of complex systems will be discussed in this course with the emphasis on discrete event systems.

### Intended Learning Outcomes (ILO)

Upon the successful completion of this course, you shall be able to:

1. Determine the properties of different types of physical systems and different types of simulations that are suitable to analyze their behaviors;
2. Analyze data collected from real world and build input models for simulation studies;
3. Conduct various simulation studies to investigate the behaviors of complex systems;
4. Conduct statistical analysis of the simulation outputs; and
5. Analyze discrete event systems through the competent use of computer simulation methods and mathematical modeling techniques.

## CE4016 and CZ 4016 – Advanced Topics in Algorithms

<b>Academic Year</b>	AY1819	<b>Semester</b>	1					
<b>Course Code</b>	CE/CZ4016							
<b>Course Title</b>	Advanced Topics in Algorithms							
<b>Pre-requisites</b>	CZ/CE2001 Algorithms							
<b>Pre-requisite for</b>	NIL							
<b>No of AUs</b>	3							
<b>Contact Hours</b>	Lectures	24	TEL	0	Tutorials	11	Quizzes	4

### Course Aims

This course aims to develop your ability to identify key structural components in algorithms, problems and domains alike, and to exploit them to create provably computationally efficient solutions. This course builds on basic skills obtained in the prerequisite “Algorithms” course to broaden the range of analysis techniques that you use; provide you with intricate, elegant and actionable algorithmic design patterns; and develop your skill in exploiting salient problem features to facilitate computation.

Algorithms and designs presented in this course were at the beginning of multiple disciplines that now dominate the IT industry, and serve as a stepping stone for your further development for such roles as an algorithms engineer/developer or an applied researcher in computer technologies.

### Intended Learning Outcomes (ILO)

This course equips you with additional techniques for algorithmic performance analysis, performance speedup, and algorithm construction based on domain structure or salient features. Upon the successful completion of this course, you shall be able to:

1. Analyse, classify and compare algorithms and problems from the computational effort point of view;
2. Exploit recurring, dynamic and geometric problem structures to facilitate computation;
3. Recognise limitations of exact computational methods, and exploit the benefits of error tolerance.