COURSE TITLE	**:-**	**Algorithm Analysis and Design**			
COURSE CODE	**:-**	**DSAL3001**			
LEVEL	**:-**	**Undergraduate**	**CREDIT POINTS**	**:-**	**3**
Parent Programme	**:-**	**Bachelor of Applied Science in Computer Engineering**			
Type of Course	**:-**	**Lecture and exam.**			
Date Validated	**:-**		**Date Modified**	**:-**	

TOTAL STUDENT WORKLOAD: 104 *hours*

The weekly hours committed to the unit will typically include *4* hours of formal delivery with students expected to manage directed and independent study *(4 hours)* by the number of weeks per semester. Credits Points will normally be directly linked to the number of contact hours per week between the student and the Instructor(s) leading the classes.

The normal weekly workload based on a 13-week period will be 104 (2+2+0+4 *13):

Lecture	*2 hrs*
Tutorial	*2 hrs*
Laboratory	*0 hrs*
Directed and independent study	*4 hrs*

PREREQUISITES

DSAL2001. GATE requires at least 80% attendance.

DESCRIPTION

DESCRIPTION:

This course provides knowledge and understanding of the advance concepts in the Design and Analysis of Algorithms. Students are provided with a more in-depth study of the performance and efficiency of algorithms. Solutions are expressed using Java with a strong emphasis on proper program design. Topics include Memorization, Greedy algorithms, Dynamic Programming, Divide and conquer techniques etc.

LEARNING OUTCOMES

At the end of this course, students will be able to:

Knowledge and Understanding

1. use big O, omega, and theta notation to give asymptotic upper, lower, and tight bounds on time and space complexity of algorithms Identify data structures useful to represent specific types of information and discuss the tradeoffs among the different possibilities.
2. determine the time complexity of simple algorithms.

Application and Analysis

3. apply mathematical, scientific, and engineering principles, tools and techniques to address a specific technical issue.
4. apply efficient algorithmic solutions to solve problems.

Synthesis and Evaluation

5. evaluate the performance of various algorithms using the brute-force, greedy, and divide-and-conquer strategies, etc.
6. synthesize an efficient algorithmic solution to solve a technical problem.

AREAS OF STUDY

- Asymptotic bounds on time and space complexity of algorithms.
- Useful data structures. Mathematical, scientific, and engineering principles, tools and techniques used to address specific technical issues.
- Application of efficient algorithmic solutions to solve complex real-world problems.

LEARNING AND TEACHING STRATEGY

Lectures are presented to the students through the use of PowerPoint slides, demonstrations, explanations, interactive question-answer discussions. Videos are also used sometimes. The students are given a copy of the slide presentations and other materials which serve as the main course notes which students may use in their revision and independent study. During the lecture, the instructor supplements the provided notes with additional explanation and examples. The student's knowledge is regularly reinforced and tested throughout the course in the form of tutorials, labs, quizzes, problem solving and assignments.

ASSESSMENT

Note: The student must obtain at least 50% in the final examination (Element 4) as well as at least 50% in the combined weighted score of Elements 1, 2, 3 and 4 to pass the course (Must-Pass Rule).

Assessment Element 1 **Assignment (Learning Outcomes 1, 2)**
Weighting: 35%
Assessment type: assignment
Special facilities: none
Time/duration: throughout the semester.

Assessment Element 2 **Midterm Examination (Learning Outcomes 2, 3, 4)**
Weighting: 15%
Assessment type: examination
Special facilities: examination conditions
Time/duration: 2 hrs

Assessment Element 3 **Final Examination (Learning Outcomes 3, 4, 5, 6)**
Weighting: 50%
Assessment type: examination
Special facilities: examination conditions
Time/duration: 3 hrs.

ASSESSMENT STRATEGY

This is a Must Pass (MP) course. The student must pass the final assessment in order to pass the course. The assessment process is designed to provide the student with regular formative (through marked and unmarked class exercises that are formally and informally reviewed and practice sets distributed to the students) and summative feedback from the course instructor. During the course, small group sessions are implemented for discussion.

Aggregation & Re-assessment Rules

The two main assessment instruments for this course, i.e. the coursework and the final assessment, are aggregated to form a single overall course mark. The final grading follows from the UTT regulations.

RECOMMENDED READING

(i) Alsuwaiyel, M. H. (2016). *Algorithms Design Techniques and Analysis, World Scientific*. Singapore: World Scientific.

(ii) Additional course readings, videos and handouts will be provided.

	Course Development by	Date
Course Author:	:-	
Course Modified by:	:-	
Course Instructor:	:- Mahindrapersad Koon	
Contact Information:	:-	
Phone	642-8888 ext. 21146	
E-mail	Mahindrapersad.koon@utt.edu.tt	
Availability times in office	14 hours per week, available by appointment	