FACULTY OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CURRICULUM

FOR

POSTGRADUATE PROGRAMMES
(M. TECH., M. Phil and Ph.D. in Computer Science)
1. INTRODUCTION

Computer Science is extremely broad and rapidly developing area of study. There are a very large number of exciting new advanced topics. Also developments in computer science and computing industry have changed our lives and our work-business, banking, financial services, teaching researching, entertainment and tourism at a rate unparalleled in the history of human society. Information is a core asset in the economics and dynamics of the modern world and the amount of information is doubling every six to seven years, so the skills of a Computer Scientist the ability to control and manage computers and information and to find computational solutions to problems- are in high and increasing demand. Although much progress has been made in computer science, there are still several problems that can not be solved without making recourse to new computing techniques, new types of computes, new programming languages, and new computing paradigms. There are many opportunities to make a positive contribution in the field of Computer Science, Computer Engineering, and Information Technology.

1.1 Philosophy
The Postgraduate programmes in the Department aim at producing effective experts. They constitute an educational framework by which graduates of Computer Science, Computer Engineering (or other appropriate sciences) and / or those with a vocational qualification coupled with considerable industrial experience can develop, deepen or update their skills and knowledge in academically and / or industrially relevant areas of advanced Computer Science, Computer Engineering and Information Technology.

1.2 Objectives

a) To train graduates to have a broad-based knowledge of Computer Science and Engineering and develop specialized interests in specific areas of computing studies.

b) To be abreast of the state-of-the-art practices in computing studies.

c) Manpower for educational and research institutions.

1.3 Areas of Specialization

The graduate programmes of the department are designed to be interdisciplinary involving at least Electronics, Computers Engineering and Computer Science. The initial focus is to prepare individuals who possess enough basic grounding in hardware and software technologies to teach most of the Computer Science and Engineering Courses. Therefore research specializations will be encouraged in any of the following areas:
a. Computer Hardware including robotics, pipelined systems and parallelism.

ii. Software Engineering.

iii. Intelligent Knowledge Based System and Databases.


vi. Computational Theory and Algorithm Complexities.

vii. Mobile and soft computing.

viii. Modeling and simulation.

2. THE DEGREE PROGRAMMES.

The department proposes to offer the following programmes:

I. Master of Technology (M.Tech). Degree Programme (Computer Science).

II. Master of Philosophy (M. Phil.) Degree Programme (Computer Science).

III. Doctor of Philosophy (Ph. D) Degree Programme (Computer Science).

Programme (i) and (ii) are based on course work and research.

2.1 Master of Technology (M. Tech). Degree Programme

2.1.1 Admission Requirement
Graduates of LAUTECH or any other approved university with appropriate Bachelor degree in Computer Science and Engineering with at least Second Lower or equivalent.

Any candidate with a Postgraduate Diploma in either Computer Science or Engineering of LAUTECH or any approved recognized institutions with a CGPA of 4.0 on a 5.0 scale (credit or weighted average of 60%) may also be considered for admission.

2.1.2. **Duration of Programme**

The duration of the programme shall be a minimum of three (3) semesters and a maximum of four semesters for full time students; a minimum of six (6) semesters and a maximum of eight (8) semesters for part-time students.

i. Course work shall be by courses qualified in terms of credit units;

ii. Courses shall last one semester and shall be examined at the end of the semester.

iii. There shall be compulsory and elective courses with the total units amounting to thirty (30) load units.

iv. Every course shall be examined by continuous assessment of between 30% and 40% and end-of-course written examination of between 60% and 70%.

v. The pass mark for all courses shall be 50%.

2.1.3. **Grading System**
At the completion of each course, the following grading system shall be applicable:

<table>
<thead>
<tr>
<th>Percentage Range</th>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than or Equal to 70%</td>
<td>A</td>
<td>Excellent</td>
</tr>
<tr>
<td>60% - 69%</td>
<td>B</td>
<td>Very Good</td>
</tr>
<tr>
<td>50% - 59%</td>
<td>C</td>
<td>Good</td>
</tr>
<tr>
<td>45% - 49%</td>
<td>D</td>
<td>Pass</td>
</tr>
<tr>
<td>Less than 45%</td>
<td>F</td>
<td>Fail</td>
</tr>
</tbody>
</table>

2.1.4 Conditions for the Award of Degree

Candidates must register for courses carrying not less than thirty-six (36) load units and not more than forty-two (42) load units, including all compulsory courses. In addition, candidates must score not less than 50% in the weighted average of the thirty-six (36) credit units, which must include compulsory and elective courses.

In addition to the course work, each candidate is required to carry out a research topic approved by the Postgraduate school.

2.1.5 Examination of Dissertation

i. The dissertation of each candidate shall be examined by panel of examiners constituted by the Postgraduate School.

ii. The research project shall carry six (6) credits.
iii. A candidate must satisfy the panel examiners by means of an oral examine in defence of his dissertation.

2.2 Master of Philosophy (M. Phil.) Degree Programme

2.2.1 Admission requirements

A candidate who scores a weighted average greater than or equal to 50% but below 55% in the M.Tech degree programme in Computer Science or Computer Engineering or Computer Science and Engineering may be considered for admission to M. Phil Programme. Candidate shall also satisfy the general requirement of the Postgraduate School.

2.2.2 Duration of Programme

The duration of programme shall be a minimum of four (4) semesters and maximum of six (6) semesters for full-time students; a minimum of six (6) semesters and maximum of eight (8) semesters for part-time students. On the expiration of the maximum duration, a candidate may apply for extension of not more than two consecutive two (2) semesters, after which the studentship shall lapse.

2.2.3 Additional Course (other applicable)

While the M. Phil Programme is essentially research-oriented, candidates may be required to take additional course(s) as individual option may require
a maximum six (6) units per semester for the first and second semesters of the programme, based on the recommendation of the department.

2.2.4 Conditions for the Award of Degree

A candidate for the M. Phil degree shall submit a thesis which shall embody the original research carried out substantially during the period of registration.

The M. Phil thesis shall be examined by a panel of examiners in line with Postgraduate School regulation.

2.3 M. Phil/Ph. D Conversion Programme

(to come under Ph. D)

A candidate with less than 60% weighted average but greater than or equal to 55% in the M. Tech programme in Computer Science Engineering or Computer Science and Engineering of LAUTECH or any other recognize institution may be admitted to the M. Phil/Ph. D. Programme.

2.3.1 Duration of Programme

A candidate may be presented for conversion examination after three (3) semesters which is organized by the Postgraduate School.

2.3.2 Arrangement of Courses

In some cases, candidate for the M. Phil/Ph. D. programme may be advised to audit some courses as may be prescribed by the Department.

2.3.3 Condition for Conversion to Ph. D. Registration
Candidate may be presented for Ph. D. conversion examination after the third semester to be able to convert Ph. D. registration; candidate must be obtain less than 60% in a seminar presentation and/or written examination. The conversion examination shall be conducted in accordance with the Postgraduate School regulations.

2.4 **Doctor of Philosophy (Ph. D.) Degree Programme**

2.4.1 **Preamble**

The duration of the Ph. Degree will normally be six semesters. It is an independent research work which normally leads the candidate to specialize in one of Computer Engineering, Software Engineering, Database or Computer Methodology including Artificial intelligence. The programme terminates after an approval of a complete research thesis has been obtained.

2.4.2 **Admission Requirements**

Candidates with Degree in Computer science or Computer Engineering or Computer Science and Engineering of LAUTECH or any other recognized institution, who must have scored at least 60% or its equivalent, in the final master’s Degree of its equivalents shall quality for admission into the Ph. D. Programme.
Candidates who score between 55 and 50% in their Master’s degree examination shall be admitted for M. Phil/Ph. D. programme. And fully specified to (60%) Ph. D. programme after completing and passing some courses specified by the supervisor and such candidates shall be taken through oral examination organized by the Postgraduate School.

A candidate that fulfils the minimum qualification for M. Phil. Programme and may proceed to Ph. D. Programme only after successful completion. In addition, all such candidates shall appear for an interview to be conducted by the department. Final admission depends on the outcome of the interview.

**Duration of Programme**

i. The duration of the programme shall be a minimum of six (6) semesters and a maximum of Ten (10) semesters for full-time students; a minimum of Eight (8) semesters and maximum fourteen (14) semesters for part-time students.

ii. On the expiration of the maximum duration a candidate may apply for extension of not more than two consecutive periods of two semesters, after which the studentship shall lapse.

**2.4.6 Conditions for the Award of Degree**

i. No course work is required apart from the university postgraduate requirement for a Ph. D. Degree. It is an independent research work which
normally leads the candidate to specialize in one computer Engineering, software engineering, Database or Computer Methodology including Artificial intelligence.

ii. Candidates shall be assessed within two semesters of registration by means of a compressive seminar to indicate their progress and level of preparedness for continuation of the programme. Candidates who fail to attain a satisfactory level of performance shall be determined by the departmental postgraduate committee.

iii. Candidates will be required to present a seminar each of Ph. D research topics prior to the submission of thesis. Satisfactory performance at this presentation is a condition to be satisfied before an oral examination can be conducted.

iv. A candidate for the Ph. D. Degree shall submit a thesis which shall embody an original research carried out substantially during the period of registration, and which shall make definite contribution to scholarship.

v. The title of the thesis shall be submitted, at least six (6) months before the oral examination, through the Faculty Postgraduate Committee to the Board of Postgraduate School for approval.

vi. The thesis shall be examined by a panel of examiners, in line with Plc school regulations (all other conditions as stipulated by the Postgraduate School).
M. Tech. / m. Phil. Computer Science and Engineering Courses

**FIRST SEMESTER**

<table>
<thead>
<tr>
<th>Group</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>CSE 701</td>
<td>Advanced Database Technology</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 703</td>
<td>Mobile Computing</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 705*</td>
<td>Advanced Numerical Computation</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 707</td>
<td>Advanced Computer Engineering</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 709</td>
<td>Guided Reading</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 711*</td>
<td>Simulation and Visualization</td>
<td>3</td>
</tr>
</tbody>
</table>

**SECOND SEMESTER**

<table>
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<tr>
<th>Group</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>B</td>
<td>CSE 702</td>
<td>Advanced Software Engineering</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>CSE 704</td>
<td>Advanced Data Structure</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>CSE 706*</td>
<td>Advanced Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>CSE 708</td>
<td>Advanced Compiler Construction</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>CSE 710</td>
<td>Soft Computing</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>CSE 712*</td>
<td>Theory of Computation</td>
<td>3</td>
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</table>

**THIRD SEMESTER**

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<tr>
<th>Group</th>
<th>Course Code</th>
<th>Course Title</th>
<th>Units</th>
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</thead>
<tbody>
<tr>
<td>A/B</td>
<td>CSE 713</td>
<td>Individual Research Work</td>
<td>6</td>
</tr>
</tbody>
</table>

**COURSE DESCRIPTION**

CSE 701:  Advanced Data Technologies
Introduction to data Technology; Transaction Management and Concurrency Control; Distributed Database Management System;
Object oriented Database: Data mining/Data ware house: Web database Development; Ontological database; Design /Development; Relation algebra /calculations.

**CSE 702: Advanced Software Engineering**

Introduction to software Engineering modeling; Component –level Design/Component Based Development; User interface design; testing strategies; product matrices; Project Management/Quality Management; Wed Application Engineering; Model-Driven Development; Software product-lines; the Economic of Reuse; component services.

**CSE 703: Mobile Communications**

Introduction to mobile computing; Mobile Development Framework and tools; Wireless connectivity and mobile Applications; Arch Design and Technology selection for mobile application; Mobile Development process; Mobile web services; wireless system architecture, Wireless Terminals and wireless content; M-commerce; E-business etc; Wireless Network Security; in Mobile Computing.

**CSE 704: Advanced Data Structures**
Data structures: Cartesian products, discriminated union, sets sequences, tree and graphs, sequential and indexed sequential file models, recursive backtracking; sparse and recursive data structures; algorithmic; correctness, efficiency inefficiency intractability, non-computability.

CSE 705: Advanced Numerical Computations

Matrix Inversion Linear Equation: Solution of Non Linear Equation and System of Equations; Approximation of function; Solution of ordinary Differential Equation of Partial Different Equation.

CSE 706: Advanced Computer Architecture

Memory systems design: code memory; Virtual Memory; Pipelining techniques; Principles Performance; Control and Use. Synchronous parallel machines inter-processor communications networks performance. Data flow machine.

CSE 707: Advanced Computer Engineering

Coded information: Binary coding, posture and negative numbers, fixed and floating point representatives. Octal, Hex, BCD, ASCII codes. Error detection. Cyclic redundancy checks.

Processor: Architecture and performance of a generalized programmable processor. Instructions field, single and multi-address instructions. Direct and Indirect addressing. Stack, stack pointers, and interrupt structures, vectored
interrupts. Taking example of 8-bit and 32-bit machines specialized processor and DSPS.

**Memory System:** Store classification, ROM, PROM RAM memory. Magnetic bobble static/Dynamic RAM. Memory Addressing, READ/Writing cycle. Timing. Floppy/Hard Disk System.

**Interfacing:** Interfacing with page selection, protocols for serial transmission UART, ACIA devices. Handshaking./ the IEEE Bus structure. Moderns, multiplexing, A – to D, D – to – A conversion.

**CSE 708: Advanced Compiler Constructions**

**CSE 709: Guided Reading**

Expectedly each candidate is to submit a Technical report in THREE specific computing application domains in conformity to recent trends in the following research areas: Computer hardware including robotics, pipelined systems and parallelism, Software Engineering, intelligent Knowledge Based System and Databases, Geographical. Information Systems (GIS), face Recognition and pattern Matching Techniques, computational Theory and Algorithm Complexities, control System Applications, Graphics Image Processing, Hypertext and Hypermedia, Distributed databases, functional programme, object-oriented programme etc.

**CSE 710: Soft Computing**
Introduction to artificial intelligence; intelligence problem solving knowledge Representation; Computational Optimization methods for solving optimal control problems such as: Heuristic Methods; Intelligent systems; Artificial Neural Networks; FUZZY logic system; Genetic Algorithms and Evolutionary programming Swam intelligent Systems.

CSE 711: **Simulations and Visualization**

*Simulation of modeling:* Numerical Visualization; Graphics: Digital cartography and Geographic Information Systems.

CSE 712: **Theory of Computation**

Regular and context free grammar; finite-state machines; Turing machines. Computability. Recursive functions, calculus, functional programming languages and correctness of imperative and functional programs: Analysis and Algorithms; Automata.

CSE 713: **Individual Research Project**

Each student is expected to submit a Dissertation/these based on original research work and written according to standards prescribed by the University post graduate committee as approved by the Senate of the University. The award of the Degree shall be recommended only after satisfactory performance in Course Examinations and Thesis assessment.