REVISED CURRICULUM

FOR

POSTGRADUATE PROGRAMME

OF THE

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

FACULTY OF ENGINEERING AND TECHNOLOGY

LADOKE AKINTOLA UNIVERSITY OF TECHNOLOGY OGBOMOSO,

NIGERIA

DECEMBER, 2011
1. INTRODUCTION

Ladoke Akintola University of Technology runs an undergraduate programme in the Department of Computer Science and Engineering which encompasses the broad spectrum of the Computer Science field of practice. This empowers the student with both theoretical and practical knowledge for a carrier in industry or in academia. Taking cognizance of the need for industrial development in Oyo and Osun States and the nation in general, in addition to the inability of the other Universities to cope with the present demand for higher degrees in this field, it has become a thing of necessity to upgrade the level of instruction and research in the department. This will enable us produce the much needed personnel to evaluate the natural resources useful as raw materials, develop processing techniques through basic and applied research and provide technical and managerial skills to industry.

The postgraduate degree programmes of the Department of Computer Science and Engineering are designed to offer theoretical and experimental research activities to qualified students, to deepen their knowledge of the theory
and practice of the Computer Science and prepare them for active participation in the furtherance of knowledge and in the socio-economic development of the nation and the sponsoring states in particular. The student is encouraged to be conversant with the current development in the basic research and application of his field of study to industry, in general, and become a self-reliant practicing computer scientist, either serving in the public and private sectors of the economy, or self-employed.

Competence in the use and application of digital computers, software, simulation packages and information technology in providing solutions to scientific and engineering problems is to be emphasized.

1.1 Aims and Objectives

There is acute shortage of qualified hands both in the training institutions and in the industry. The problem is the insatiable demand for computing professionals that have left the Universities and Polytechnics virtually unable to retain its teaching and technical computer professionals. This is the raison d’etre for this advanced degree programme in Computer Science and Engineering whose goals are.

Hence the main objectives are to:
i. Deepen the knowledge of students in the theory and practice of Computer Science and Engineering.

ii. Prepare the student for active participation in the furtherance of knowledge and in the socio-economic development of the nation.

iii. To impact advanced knowledge of both software and hardware technologies to computing graduates, either serving in the public and private sectors of the economy or self-employed.

iv. Develop the students’ investigative mind through participation in supervised novel project research and articulate reporting of the finding through a thesis.

v. To convert graduates of Engineering and the Physical Sciences into much needed skilled hands in computing.

1.2 Nature of Programme

The graduate programme of the department is designed to be interdisciplinary involving at least Electronics, Computer 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:
i. Computer Hardware including robotics and parallelism;

ii. Software Engineering; Intelligent Knowledge-Based Systems and Databases.

2. THE DEGREE PROGRAMMES

The department proposes to offer the following:

(a) Academic Postgraduate Programmes such as:

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

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

(iii) Doctor of Philosophy (Ph. D) Degree Programme.

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

(b) Postgraduate Diploma (PGD) Programmes such as:

(i) Postgraduate Diploma in Computer Science.

(ii) Postgraduate Diploma in Computer Engineering; and,

(c) Professional Degree Programme.

(i) Master in Information Technology (MIT).

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

Preamble
The Master of Technology in Computer Science option. Degree is a programme being processed by the Department to be offered with the main purpose of producing graduates whose carriers will be in the Research, Training and Professional practice of Computer Science. To achieve this goal, the course contents have been designed specially to create awareness for latest development internationally in engineering practice.

**Admission Requirements**

Graduates of LAUTECH or any other approved university with appropriate Bachelor degree in Computer Science and Engineering and at least Second Class Lower or equivalent. However, any graduate who achieve a lower classification, or who passes a first degree in any natural sciences or other engineering discipline with a Second Class Lower but with a Postgraduate Diploma in either Science or Engineering of LAUTECH with a CGPA of 4.0 on a 5.0 scale (credit or weighted average of 60%) may also be considered for admission.

**Duration of Programme**

The duration of the programme shall be a minimum of twelve (12) calendar months and a maximum of twenty-four (24) calendar months for full time students; a minimum of twenty-four (24) calendar months and a maximum of forty-eight (48) calendar months for part-time students.

**Arrangement of Courses**
i. Course work shall be by courses qualified in terms of credit units and numbered 600 series.

ii. Courses shall last one or two semesters and shall be examined at the end of the semester in which they are completed;

iii. There shall be compulsory and elective courses with the total units amounting to thirty (30) credit 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% on a maximum scale of 100%.

**Grading System**

At the completion of the programme, the following grading system shall be applicable.
Greater or Equal to 70% A Excellent

60% - 69% B Very good

50% - 59% C Good

45% - 49% D Pass

Less than 45% F Fail

Condition for the award of degree

Candidates must register for courses carrying not less than Thirty (30) credit units and not more than Thirty-Six (36) credit units, including all compulsory courses. In addition candidates must score not less than 50% in the weighted average of the best Thirty (30) credit units, which must include compulsory and elective courses.

In addition to the course work, each candidate is required to research a topic approved by the Department and the Faculty Postgraduate Committee in addition to the other conditions imposed by Faculty and the Postgraduate School.

Examination of Dissertation

i. The dissertation of each candidate shall be examined by a panel of examiners consisting of the Head of Department (as Chief Examiner), the candidate’s project supervisor, other postgraduate teaching staff as may be appropriate and the External Examiner approved by the Board of the Postgraduate School.
The research project shall carry six (6) credits.

A candidate must satisfy the panel of examiners by means of an oral examination in defence of his dissertation.

**Definition**

Compulsory Course (C) – a course that must be taken and passed. Mark scored shall count towards graduation and a candidate cannot graduate without passing it. Elective Course (E): - A course which a candidate freely selects. Mark scored shall count towards graduation and a candidate cannot graduate without passing it.

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

**Preamble**

The M. Phil degree is specifically research-oriented to prepare entry level personnel for the Ph.D. programme.

**Admission Requirements**

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

**Duration of Programme**
The duration of programme shall be a minimum of four (4) semester and maximum of six (6) semester for full-time student; a minimum of six (6) semester 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.

Arrangement of Course

While the M. Phil Programme is essentially research-oriented, candidates may be required to take additional course as individual option may require.

Conditions for the award of degree

i. 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.

ii. The M. Phil thesis shall be examined by a Board comprising the Head of Department as Chairman, the Supervisor, Internal Examiners, Postgraduate School representative and an External Examiner.

M. Phil./ Ph. D. Programme

Admission Requirements

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

Duration of Programme

A candidate will be deemed to have reached the stage of conversion to Ph. D. after completing and/or passing some courses specified by his supervisor and going through oral examination organized by the postgraduate school.

Arrangement of Course

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.

Conditions for Conversion to Ph. D. registration

To be able to convert to Ph. D. registration, candidate must not 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

Preamble
The duration of the Ph. D. Degree will normally be six semesters. No coursework is required apart from the university postgraduate requirement for a Ph. D. Degree. It is an independence 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 completed research thesis has been obtained.

**Admission Requirements**

i. Candidates with Master 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 or its equivalent shall qualify for admission into the Ph. D. Programme.

ii. Candidates who score between 55 and 59% in their Master’s degree examination shall be admitted for M. Phil/Ph.D. Programme and fully convert to 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.

iii. Candidates who score between 50 and 54% in their Master’s degree examination shall first register 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.
# COURSE WORK FOR M. TECH./ M. PHIL’S DEGREE

## Semester 1

<table>
<thead>
<tr>
<th>COURSE CODE</th>
<th>TITLE</th>
<th>UNITS</th>
<th>LECTURER</th>
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<tr>
<td>CSE 601</td>
<td>Database Technology</td>
<td>3</td>
<td>Dr. J. O. Emmoyibofahre/ Dr. S. O. Olabiyi</td>
</tr>
<tr>
<td>CSE 603</td>
<td>Computer Communications Systems</td>
<td>3</td>
<td>Dr. G.A. Aderonmu</td>
</tr>
<tr>
<td>CSE 607</td>
<td>Advanced Computer Engineering</td>
<td>4</td>
<td>Dr. O. A. Fakolujo</td>
</tr>
<tr>
<td>CSE 609</td>
<td>Guided Reading</td>
<td>3</td>
<td>Dr. E. O. Omodiora</td>
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<tr>
<td>CSE 602</td>
<td>Software Engineering</td>
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<td>Dr. Aderonmu</td>
</tr>
<tr>
<td>CSE 604</td>
<td>Algorithms; Analysis and Application</td>
<td>3</td>
<td>Prof. O.M. Bamigbola/ Dr. J.O. Emmoyibofahre</td>
</tr>
<tr>
<td>CSE 610</td>
<td>Advanced Computer Architecture</td>
<td>3</td>
<td>Dr. O. A. Fakolujo/ Dr. E.O. Omidora</td>
</tr>
<tr>
<td>CSE 612</td>
<td>Computational Theory</td>
<td>3</td>
<td>Dr. S. O. Olabiyi</td>
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### M. Tech./ M. Phil. Computer Science and Engineering Courses

<table>
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<tr>
<th>Group</th>
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<tr>
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<td>Database Technology</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 602</td>
<td>Algorithms: Analysis And Application</td>
<td>3</td>
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<td>B</td>
<td>CSE 603</td>
<td>Computer Communication Systems</td>
<td>3</td>
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<tr>
<td>A</td>
<td>CSE 604</td>
<td>Software Engineering</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>CSE 605</td>
<td>Microprocessor and Microcomputer</td>
<td>3</td>
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<tr>
<td>B</td>
<td>CSE 606</td>
<td>Solid State Devices</td>
<td>3</td>
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<tr>
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<td>CSE 607</td>
<td>Advanced Computer Engineering</td>
<td>4</td>
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<tr>
<td>B</td>
<td>CSE 608</td>
<td>High Speed Devices and Circuits</td>
<td>3</td>
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<tr>
<td>A</td>
<td>CSE 609</td>
<td>Guided Reading</td>
<td>3</td>
</tr>
<tr>
<td>B</td>
<td>CSE 610</td>
<td>Advanced Computer Architecture</td>
<td>3</td>
</tr>
<tr>
<td>A</td>
<td>CSE 611</td>
<td>Algorithms and Data Structures</td>
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<tr>
<td>A</td>
<td>CSE 612</td>
<td>Computational Theory</td>
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<tr>
<td>B</td>
<td>CSE 614</td>
<td>Digital and Analog Systems</td>
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<td>B</td>
<td>CSE 616</td>
<td>CAD FOR VLSI</td>
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<td>CSE 618</td>
<td>Formal Method</td>
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<td>A</td>
<td>CSE 620</td>
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<td>A/B</td>
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<td>Individual Research Project</td>
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COURSE DESCRIPTION

CSE 601: Database Technologies

Purposes, function and objectives of a database system; design; data modeling; the relational data model. Relational algebra and calculus. SQL and other query languages. Distributed databases.

CSE 602: Algorithm – Analysis and Applications.

Analysis and design of algorithms, complexity, n- p completeness, algorithms for searching, sorting: algorithms which operate on trees, graph, strings.

Database algorithms: B – trees and hashing, disk access algorithms.

Application of algorithms for text processing.

CSE 603: Computer Communication Systems

CSE 604: Software Engineering

Software Engineering: Rational: quality assurance. Project life cycle and its management; requirements analysis; feasibility analysis, scheduling, costing, systems analysis, specification, design, integration and evaluation. Methods for analyzing and designing software systems: SSADM, JSD, and OOA

Aspects of professional practice, legal and social issues, ethnics and standards.
CSE 605: Microprocessor and Microcomputers

**Basic Hardware**: Advantages of microprocessors, essential features, interfacing TTL and MOS circuits, Tristate devices, CMOS devices.

Hardware and firmware: Software program machines. Basic processor cycle, PROM’S ROM’S. Program counters and stack pointer. Addressing structure and memory portioning. But protocols, Array processor, bit-slice processors, Digital signal processors, Transputer, Neural Networks.


CSE 606: Solid State Devices

Resume of Solid State Theory: Application of time-independent schrodinguer’s equation to simple problems, particle in a box, Tuning band theory, Analogy, with Breggss equation, Density of states, effective mass, Holes, Effects of Adding impurities, Transport equations.

**Device**: The solution of the transport equation for a P – N Junction; capacitance, I-V characteristics. A simple model for the operation of a junction transistor, Diffusion capacitance Basewidth modulation. Field effect transistor.
CSE 607: 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.

**Processors:** Architecture and performance of a generalized programmable processor. Instructions fields, single and multi-address instructions. Direct and indirect addressing. Stack, stack pointers, interrupt structures, vectored interrupts. Taking examples of 8-bit and 32-bit machines specialized processor and DSPS.

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


CSE 608: High Speed Devices and Circuits

CSE 609: Guided Reading

Expectedly each candidates is to submit a Technical report in THREE specific computing application domain 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 programming, Object-oriented programming e.t.c.

CSE 610: Advanced Computer Architecture

CSE 611: Data Structure and Algorithms

Data structures: Cartesian products, discriminated unions, 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 612: Computational Theory

Regular and context free grammars; finite-state machines; Turing machines. Computability. Recursive functions, calculus, functional programming languages and correctness of imperative and functional programs.

CSE 614: Digital and Analog Systems

The system concepts of structure and behaviour as they appear in formal models of analog and digital systems. Digital systems: combinatorial systems and sequential systems. Analog systems, Analog Computer
Components, simple systems, linear systems, Analysis, Linear Discrete Systems, system composition and decomposition.

**CSE 616: CAD for VLSI**

Full custom versus semi-custom programmable devices. Realizing VLSI. Schematic versus HDL. Cell design, Delays and Loading, static and dynamic logic: VLSI applications. Types of simulators, models and techniques employed. Fault simulation ATPG. Symbolic layout techniques, design rule checkers, back annotation ask interfaces. Test methodology, design for test, scan path testing, BIST, CAT languages and hardware. Laboratory sessions should be organized to illustrate designs via the specified techniques.

**CSE 618: Formal Methods**

A rigorous approach to software development. Logical foundations. Specification of data types: implicit and direct specification of functions and operations. Reasoning about specifications, refinement, and axiomatic semantics.

**CSE 620: Intelligent Knowledge Based System**

Artificial Intelligence, LISP programming or PROLOG programming, natural language processing, translation network analysis, intelligent document retrieval, expert systems.

**CSE 622: Individual Research Project**
Each student is expected to submit a Dissertation/Thesis 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.