Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC111**: Computer Application Packages I (**1 Unit Compulsory; LH: 0; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Information systems, who are highly skilled in practice of preparing document, making presentations and quick reporting of data in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines

**Overview**

Computer Application Packages I is the use of computer for document processing, creating presentations and manipulating data for reporting. The choice of Microsoft office package is sound due to its practical relevance in the industry and academia till date. The package has evolved over many years and it still remains the most popular choice for word processing, presentation and reporting.

The goal of this course is to expose the undergraduate student at 100 level to the use of Microsoft office packages, which include Microsoft word, Power point and Microsoft excel. Thus, the course is designed to build the capacity of the student in document processing, presentation and data reporting.

**Objectives**

The objectives of this course are to:

1. describe how to use Microsoft word for word processing: enter and edit text, save and browse document;
2. explain how to use Microsoft word to enhance the appearance of a document by using various formatting options and create tables, insert headers and footers, print documents and insert graphics;
3. describe how to use PowerPoint for creating new presentations that include text, graphics, WordArt, tables, charts and diagram;
4. explain how to use Microsoft Excel to enter and edit text, values, save workbooks in various format, move and copy data; and
5. describe to use Microsoft Excel to manipulate data with formulas, manage multiple worksheet and work books efficiently.

**Learning Outcomes**

On completion of the course. students should be able to:

1. use Microsoft word to enter and edit text, and save and browse documents;
2. prepare documents by using various formatting options and create tables, insert headers and footers, proof and print documents and insert graphics;
3. create new presentations using Microsoft PowerPoint that include text, graphics, WordArt, tables, charts, diagram, edit and format slide content, and apply transition effect;
4. use Microsoft Excel to enter and edit text, values, save workbooks in various format, move and copy data; and
5. manipulate data with Microsoft excel using functions and formulas, manage multiple worksheet and work books efficiently.

**Course Contents**

Getting start with Microsoft word. Navigating and selection technique. Document navigation. Editing text. Formatting text. Tables, page layout. Proofing and printing outline. Graphics. Creating tables. Creating charts. Getting start with Microsoft PowerPoint. New presentation. Formatting slides. Drawing objects. Graphics. Table and charts. Proofing and delivering presentations. Graphics and multimedia content. Getting start with Excel. Entering and editing data. Modifying a worksheet. Using functions. Formatting worksheets. Printing. Creating charts. Managing large worksheets. Using multiple worksheets and workbooks. Web and internet features. List and tables

**Minimum Academic Standard**

Computer Laboratory with workstations equipped with Microsoft Office (One Computer to One Student).

Covenant University, Ota

Centre for Entrepreneurial Development Studies

University Wide Course

All Programmes

**COV-ENT111:** **Design Thinking** (1 Unit Compulsory; LH: 0; PH: 45)

**Senate Approved Relevance**

Covenant University (CU) is fashioned towards producing graduates with sound knowledge and a broad understanding of the scope and contents of entrepreneurship. CU graduates would have the right professional attitudes, ethics and skills in entrepreneurship that would enable them to be creative in tackling business problems. The students will further be exposed to other branded programmes such as Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of CU graduates. It thus assists them to be very relevant in all areas of the business system and national economy, including handling the challenges of the changing business environment.

In accordance with the University’s vision of Raising a New Generation of Leaders, we endeavour to produce graduates that are job creators and not just potential employees. Apart from enhancing the commercialisation knowledge of the students, the graduates of Covenant University would also be simultaneously prepared to become corporate entrepreneurs. With adequate skill in design thinking, the students would be simultaneously prepared for corporate entrepreneurship as well as independent and creative research at postgraduate level.

**Overview**

This course is designed to evolve and sharpen both the imaginative and creative ability of all the undergraduate students of Covenant University thereby cultivating their entrepreneurial mindset. The word "design" has traditionally been used to describe the visual aesthetics of objects such as books, websites, products, interiors, architecture, and fashion. But increasingly, the definition of design has expanded to include not just artifacts but strategic services and systems. As the challenges and opportunities facing businesses, organizations, and society grow more complex, and as stakeholders grow more diverse; an approach known as "design thinking" is playing a greater role in finding meaningful paths forward.

The world and its challenges demand a new breed of professional—those who are trained to drive innovation no matter the situation, industry, or problem. This course draws on methods from social sciences, and combines them with ideas from the arts, tools from the engineering and design and insights from the business world. The goal of Design Thinking is, therefore, to provide a solid foundation for entrepreneurship courses by raising creative thinkers who will be ready to build entrepreneurial skills and competencies required for the world of work.

**Objectives**

The specific objectives of the course are to:

1. explain what is meant by design thinking and introduce the students to different stages in design process;
2. identify and demonstrate the steps involved in design research that will enable the students to identify potential customer needs;
3. describe how the students can immerse themselves directly into an experience to evoke empathy;
4. expose the students to different ideation methods that will enable them to generate viable ideas;
5. describe the importance of visualisation and communication in design thinking; and
6. explain the role of teamwork in design thinking.

**Learning Outcomes**

On completion of this course, the student should be able to:

1. develop a strong understanding of the design process and how it can be applied in a variety of business settings;
2. undertake design research and understand the unique needs of a company around specific challenges;
3. build empathy for target audiences from different cultures;
4. develop and test innovative ideas through a rapid iteration cycle;
5. create at least a visual representation of an idea; and
6. develop the willingness to leverage on teamwork for creativity.

**Course Contents**

Introduction to design thinking. Design research strategies. Introduction to synthesis. The art of ideation. Prototyping strategies. User testing. Journey mapping and ideation.Mind mapping. Customer co-creation. Value chain analysis. Team work. Visualizing ideas. Communicating ideas and effective storytelling.

**Minimum Academic Standard**

Startup Lab/Business hub with ideation boards

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

**COV-TMC111: Introduction to Total Man Concept**  (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

Introduction to Total Man Concept lays the foundation for a four to five years’ journey into the knowledge of God and self. It covers several perspectives and schools of thought on the origin of man while focusing on and adopting the Biblical account. The course leads the students in the exploration of the purpose of existence and the need to find and maintain their place in God’s master plan.

The course aims to expose students to the fundamental issues around man’s existence and purpose. It also introduces the students to the seven Core Values of Covenant University: Spirituality, Possibility Mentality, Capacity Building, Integrity, Responsibility, Diligence and Sacrifice. The Core Values will be taught from a scriptural standpoint and with experiential examples.

**Objectives**

The specific objectives of the course are to:

1. define the concept of the total man;
2. identify the elements of the triune nature of man;
3. identify the core values of Covenant University;
4. discuss how each core value of the University helps to live as a total man; and
5. highlight the demands of the seven core values.

**Learning Outcomes**

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

1. define the concept of the total man;
2. identify the three (3) elements of the triune nature of man;
3. identify the seven (7) core values of Covenant University;
4. discuss in clear terms how each core value of the University helps to live as a total man; and
5. highlight at least three (3) demands of the seven core values.

**Course Contents**

Introductory lecture. What is total man concept? The triune nature of man. The core value of Spirituality. The core value of Possibility Mentality. The core value of Capacity Building. The core value of Integrity. The core value of Responsibility. The core value of Diligence. The core value of Sacrifice

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC122: **Computer Application Packages II (**1 Unit Compulsory; LH: 0; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Information Systems, who are highly skilled in practice of graphics editing and image designs in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines

**Overview**

Computer Application Packages II is the use of computer for graphics editing and image designs. The choice of Adobe Photoshop is sound due to its practical relevance in the industry and academia till date. The package has evolved over many years and it still remains the most popular choice for graphics editing and image designs.

The goal of this course is to expose the undergraduate student at 100 level to the use of Adobe Photoshop. Thus, the course is designed to build the capacity of the student in graphics editing and image design.

**Objectives**

The objectives of this course are to:

1. describe what Adobe Photoshop is and its usefulness;
2. demonstrate to the student how to design images with adobe Photoshop;
3. demonstrate to the student how to use selections, layers, and painting tools;
4. demonstrate to the student how do photo retouching using different methods;
5. demonstrate to the student how to make colour corrections;
6. demonstrate to the student how use masks and the quick mask mode;
7. demonstrate to the student how use the pen tool;
8. demonstrate to the student how to create special effects; and
9. show the student how to print and export designs to another environment.

**Learning Outcome**

On completion of the course, students should be able to:

1. explain what Adobe Photoshop is and how it can be useful in practice;
2. use Adobe Photoshop to design images;
3. use the selections, layers, and painting tools;
4. perform photo retouching using different methods;
5. make colour corrections;
6. use masks and the quick mask mode;
7. use the pen tool in Adobe photoshop;
8. create special effects; and
9. print and export designs into another environment.

**Course Contents**

Getting started using photoshop. Working with images. Resizing and cropping images. Working with basic selections. Layers. Painting in photoshop. Photo retouching. Colour correction. Using masks and the quick mask mode. Working with pen tool. Creating special effects. Printing and exporting designs.

**Minimum Academic Standard**

Computer Laboratory with workstations pre-installed with Adobe photoshop (One Computer to One Student).

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC124**:** **Introduction to Computational Biology** (2 Units Compulsory; LH: 15; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in applying computational methods and tools in biomedical research in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

This course covers the algorithmic and machine learning foundations of computational biology combining theory with practice. Through a combination of foundational topics in computational biology and current research frontiers, the course aims to study fundamental techniques, recent advances in the field, and work directly with current large-scale biological datasets.

The goal of this course is to develop a deeper understanding of techniques and concepts used in Computational Biology. The course will strive to focus on a small set of approaches to gain both theoretical and practical understanding of the methods.

**Objectives**

The objectives of this course are to:

1. describe the properties of DNA, RNA, and proteins, as well as the relationships among these molecules;
2. explain the use of the base pairing rules and the genetic code for transcription and translation;
3. describe the importance of computational biology, proficiencies and application areas;
4. demonstrate the use of available bioinformatics databases, tools and resources and how they can be best used to aid biomedical research;
5. describe the types, causes and effects of genetic mutations as well as genetic diseases;
6. explain the concept of sequence alignment, phylogenetics and their algorithms; and
7. demonstrate the application of sequence alignment tools by using any tool to compare sequences and building phylogenetic trees.

**Learning Outcomes**

On completion of the course, students should be able to:

1. explain the differences among DNA, RNA and proteins;
2. write a program to convert DNA sequences into RNA sequences and protein sequences using base pairing rules and the genetic code;
3. discuss the importance of computational biology, proficiencies and application areas;
4. use basic biological databases for retrieving sequences as well as other bioinformatics resources such as genome browsers for genome annotation;
5. explain the basis of genetic diseases and write simple programs to determine the types of mutations;
6. explain the concept of sequence alignment and phylogeny; and
7. use any sequence alignment software to compare sequence and use any appropriate phylogenetics algorithm to construct a phylogenetic tree for the sequences.

**Course Contents**

Cell biology basics. DNA, RNA and Proteins. Central dogma (transcription and translation). Genes. Genomes and the genetic code. Model organisms. Introduction to genome sequencing. What is Computational Biology/Bioinformatics? Why is it important? Bioinformatics proficiencies. Application areas. Biological databases and resources (NCBI and EBI). Genome annotation using genome browsers. Advanced literature searching – PubMed. DNA analysis, e.g., sequence features, start site and restriction sites. Protein function classification. Sequence file formats. Mutations and mutation analysis. What is sequence alignment? Global and local alignment. Pairwise and multiple sequence alignment. Sequence alignment: gaps and scoring matrices. Sequence alignment algorithms. Dot plots. Dynamic programming. Database search: BLAST. Significance of alignment scores. Information content. Mechanisms of molecular evolution and speciation. Building phylogenies from biological data

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

Centre for Entrepreneurial Development Studies

University Wide Course for

All Programmes

**COV-ENT121:** **Technopreneurship (Technology and Entrepreneurship)** (1 Unit Compulsory; PH: 45)

**Senate Approved Relevance**

Covenant University (CU) is fashioned towards producing graduates with sound knowledge and a broad understanding of the scope and contents of entrepreneurship. This course is a branded course targeted at producing the graduates that we envision. CU graduates would have the right professional attitudes, ethics and contemporary skills in entrepreneurship that would enable them to be creative in tackling business problems. The students will further be exposed to other branded programmes such as Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of CU graduates. It thus assists them to be very relevant in all areas of the business system and national economy, including the formation and management of technology start-ups.

In accordance with the University’s vision of Raising a New Generation of Leaders, we endeavour to produce graduates that are job creators and not just potential employees. This course will not only enable the graduates of CU to be tech-savvy but it will further propel many of them towards becoming founders of technology-based start-ups.

**Overview**

This course will help to equip Covenant University graduates with contemporary sills needed for the modern day entrepreneurship. It further emphasises the need for the deployment of technology in entrepreneurial processes.

Apart from the deployment of technology for ideation and start-up formation, this course shall focus on cyber security and Social media marketing. Cyber security is about protecting yourself and others from attacks that are carried out primarily with computers. Meanwhile, social media marketing entails the deployment of social media for marketing activities.

**Objectives**

The specific objectives of the course are to:

1. discuss the meaning of technopreneurship by identifying various components of technopreneurship;
2. demonstrate how to deploy social media for entrepreneurial marketing;
3. illustrate how content marketing are created and applied in business;
4. describe how to abide by email marketing best practices;
5. demonstrate how to develop sales page;
6. illustrate how to identify various forms of cyber threats, vulnerabilities and attacks; and
7. illustrate the art of protecting business secrets

**Learning Outcomes**

On completion of this course, the student should be able to:

1. apply appropriate form of technology for entrepreneurial activities based on the nature roles of such components of technopreneurship;
2. deploy different social media marketing strategies for entrepreneurial success;
3. create suitable content marketing for an identified business;
4. deploy email marketing for entrepreneurial success and abide by the best practices;
5. develop professional sales page for their businesses or other identified businesses;
6. detect various forms of cyber threats, vulnerabilities and attacks; and
7. demonstrate how to protect business secrets

**Course Contents**

Use of social media for entrepreneurial marketing. Content marketing strategy. Crafting a digital advertising plan. Application of email marketing best practices. Affiliate marketing practices. Sales page development. Search marketing activities. Techniques for detecting cyber security threats, vulnerabilities, and attacks. The art of protecting secrets. The art of ensuring integrity. The ethics of working in cyber security.

# Minimum Academic Standard

Business hub/ ICT studio

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

**COV-TMC121: Self-Discovery Methods**  (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

The course on Self-Discovery Methods focuses on exploring the ‘self’ with a view to helping the students to identify who they are with respect to God’s divine purpose for their lives. It will focus on a journey of self-discovery by exploring the self and helping students identify who they are. It will serve to answer questions about who I am. Why am I here? And Where am I going? Areas of strengths, unique personality traits, family backgrounds, aspirations, and potentials will be covered.

The course aims to uncover aspects of self that are usually not uncovered in daily living. The emphasis, however, will be on discovering Biblical truths concerning God’s purpose for man. This course is critical to understanding what makes one person different from another. As the students develop a healthy sense of self, as presented in the scripture, they will improve their self-awareness and self-esteem.

**Objectives**

The specific objectives of the course are to:

1. identify the importance of self-discovery;
2. identify the place of spiritual capacity building in the self-discovery process;
3. learn biblical models for self-discovery;
4. state the biblical framework for self-esteem; and
5. situate the connection between personal vision and mission.

**Learning Outcomes**

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

1. identify six (6) importance of self-discovery;
2. discuss in specific terms the place of spiritual capacity building in the self-discovery process;
3. explain any three (3) biblical models for self-discovery;
4. discuss with practical illustrations the biblical framework for self-esteem; and
5. highlight five (5) connections between personal vision and mission.

**Course Contents**

Introductory lecture. Self-discovery methods. Self-discovery and spiritual capacity. Biblical models of self-discovery. Self-discovery and redemption realities. Biblical framework for self-esteem. The power of conscience. Self-discovery. The nature and power of the mind. Self-discovery and body dynamics. Self-confidence building. Locus of control and attribution. The power of potential.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC211: **Programming with C++** (3 Units Compulsory; LH: 30; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in creating object-oriented programs using the C++ programming language to solving real-life problem in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Course Overview**

This course introduces advanced programming skills and focuses on the core concepts of object-oriented programming and design using a high-level language. using C++. Object-oriented programming represents the integration of software components into a large-scale software architecture. Software development in this way represents the next logical step after learning coding fundamentals. allowing for the creation of sprawling programs.

The goal of this course is to expose practical mastery of object-oriented concepts such as classes, objects, data abstraction, methods, method overloading, inheritance and polymorphism.

**Course Objectives**

The specific objectives of the course are to:

1. describe the principles of object-oriented programming in a higher-level programming language. such as C++;
2. utilize object-oriented programming to frame software architectures. with care towards separation of concerns and abstraction;
3. design software for reuse of code;
4. describe how to write object-oriented programs that combine functions and data;
5. analyze a problem statement to develop a mental model of objects necessary to create a software architecture;
6. describe how to translate abstract concepts into software; and
7. describe how to apply the object-oriented programming language to develop software. including programs utilizing multiple class's.

**Learning Outcomes**

At the end of this course. students should be able to:

1. explain the principles of object-oriented programming in a higher-level programming language;
2. utilize object-oriented programming to frame software architectures. with care towards separation of concerns and abstraction;
3. design and implement software for reuse of code;
4. develop object-oriented programs that combine functions and data;
5. analyze a problem statement to develop a mental model of objects necessary to create a software architecture;
6. translate abstract concepts into software; and
7. to apply the object-oriented programming language to develop software. including programmes utilizing multiple class's

**Course Contents**

Object-oriented fundamentals. Programming paradigms. C++ basics - built-in types, arrays and pointers, comments, keywords and I/O streams. Built-in operators and control constructs, dynamic free store operators. C++ functions - definition and prototypes. Inline functions structures and references. Classes and objects. Encapsulation - data members. Member functions - private and public. Constructors and destructors. Default arguments. Storage allocation and deallocation. This pointer. Copy constructors. Overloading - overloading functions. Overloading operators - unary and binary operators. Initialization vs assignment. Stream input and output. Polymorphic programming – inheritance. Public inheritance and subtyping. Base and derived classes. Base class initialisation. Using protected keyword. Virtual functions. Base class pointers and references. Dynamic binding - abstract base classes. Pure virtual functions. Virtual destructors. Code reuse in C++ - containment, objects as data members, member initialization. Private inheritance - base and derived relationship. Access declarations. Designing with C++ - templates, template functions, and template classes. Exceptions - try, catch, throw, and exception hierarchies.

**Lab Work**: Programming assignments involving hands-on practice in the design and implementation of simple algorithms such as equations/formulas, standard deviation, searching and sorting. Practice in developing and tracing simple recursive algorithms. Developing programs involving inheritance and polymorphism.

**Minimum Academic Standard**

Computer Laboratory with different programming Languages (One Computer to One Student).

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

**COV- TMC211: Success Parameters**  (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

Success Parameters course offers an exposition on definitions and Biblical parameters for success. It will emphasise the distinction between definitions of success in general parlance compared to definitions and dimensions of success as God ordained it. It explores the foundations for success and related factors in understanding God’s parameters for success, along with framework and specifications in different contexts.

Attention will be paid to bringing up Biblical models of success as contained in the Holy Bible. Understanding success, personal profile building and biographical analysis of some success giants will also form areas of emphasis for this course. By the end of the semester, students will be expected to articulate their mission statement for success, putting these within time lines and giving attention to preparations needed to actualise these expectations.

**Objectives**

The specific objectives of the course are to:

i. identify general definitions of success;

ii. define success from the Biblical perspective;

iii. discuss specific parameters for sustainable success;

iv. evaluate secular examples of unsustainable success;

v. identify Biblical examples of success; and

vi. articulate personal commitment to Biblical success secrets.

**Learning Outcomes**

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

1. identify any three (3) general definitions of success;
2. define in clear terms the Biblical perspective of success;
3. discuss five (5) specific parameters for sustainable success;
4. evaluate any three (3) secular examples of unsustainable success;
5. identify any four (4) Biblical examples of successes; and
6. articulate personal commitment to Biblical success secrets.

**Course Contents**

Introduction to success parameters. Exploration of the definitions of success. Biblical foundations for success. The secrets of success. The place of endowment. The place of work. The place of commitment. The place of character. The place of preparation. Pillars of success in Scriptures. Biblical examples of success (Old Testament). Biblical examples of success (New Testament). The body segment. Physical exercises I. Physical exercises II.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

**Covenant University, Ota**

African Leadership Development Centre

University-Wide Course

Diploma in Leadership Development

**COV-DLD211: Introduction to Leadership Development** (1 Unit Compulsory: PH: 45)

**Senate Approved Relevance**

The Diploma in Leadership Development (DLD) programme is designed to produce graduates with a well-grounded knowledge of the concepts of leadership and its application to the array of African and global leadership challenges. The programme offers the redefinition of leadership by emphasising that it is a function of the feat achieved in people’s fields that make them a reference point rather than the position they occupy. DLD is one of the custom-made courses at Covenant University that develop the unique capacity in students to emerge as graduates that go beyond identifying problems to solving them, go beyond the narratives of the blame game to offering expert and intellectual engagements, and go beyond recycling ideas to creating innovative alternatives that are efficient and effective. Consequently, this programme, offered across all the academic departments of the university, will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with sound mental reasoning to pursue and excel in postgraduate studies.

**Overview**

Introduction to Leadership Development is an exploration of the definitions of leadership. It covers several perspectives and schools of thought on leadership while evaluating its strength and weaknesses. The course derives its foundation from Biblical principles and teaches how everyone is created for a purpose and can only excel after finding that purpose.

The course aims to expose students to the fundamental issues around leadership. The principles are applicable in all aspects of life and society. It is the basis for personal, family, corporate or civil life stability. Hence, the course will build the capacity of students in the conceptualisation of leadership and its application to relevant situations.

**Objectives**

The specific objectives of the course are to:

1. define leadership;
2. compare different definitions of leadership;
3. explore the history of leadership;
4. discuss theories of leadership;
5. examine leadership foundations;
6. identify leadership virtues and dispositions;
7. relate self-discovery to leadership development; and
8. discuss the place of vision in leadership.

**Learning Outcomes**

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

1. define leadership from the Bible;
2. compare at least five (5) different definitions of leadership;
3. identify the historic milestones that defined leadership;
4. identify and apply the elements of at least three (3) theories of leadership;
5. discuss major issues that form leadership foundations;
6. identify at least five (5) leadership virtues and dispositions;
7. apply self-discovery to leadership development; and
8. discuss the place of vision in leadership.

**Course Contents**

Introductory lecture. What is leadership? Leadership and management: A comparative review. Sociological foundation of leadership. Ethical foundation of leadership. Leadership virtues and dispositions. Servant leadership. A service mindset in the 21st century workplace. Biblical foundations of leadership. Start-up leadership: Nuances of leadership in start-ups. Personal development and leadership effectiveness. Self-discovery and leadership effectiveness. Leadership branding and packaging.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC222: **Python Programming Language I** (3 Units Compulsory; LH: 30; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in programming approaches to solving real-life problem in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the problem solving in addressing real life problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Course Overview**

This course introduces students to Python programming. Python Programming is intended for software engineers, Information systems analysts, program managers and user support personnel who wish to learn the programming language. It is intended for students with little or no programming background

The goal of this course is to leads students from the basics of writing and running Python scripts to more advanced features such as file operations, regular expressions, working with binary data, and using the extensive functionality of Python modules. Also to understand why Python is a useful scripting language for developers. ·

**Course Objectives**

The objectives of the course are to:

1. describe basic building blocks of Python statements, including selection and loop procedures;
2. describe with practical examples how functions are created and used within Python programs;
3. demonstrate the conversion of data from one type to another;
4. describe the use of lists and other important Python data structures with various application scenarios;
5. describe how to read and write from CSV files from Python programs; and
6. describe the how GUI-based Python projects are implemented. using several case studies.

**Learning Outcomes**

At the end of this course. student should be able to:

1. use basic programming tools like “if” and different types of loops;
2. write Python programs that demonstrate the use of the concept of functions;
3. demonstrate how to convert data types;
4. explain and demonstrate how to work with lists, tuples, dictionaries, and other important in-built data structures in Python;
5. build applications that make use of CSV files; and
6. develop and implement effective Python GUI-based projects.

**Course Contents**

Introduction to Python language - What is Python. Uses of Python programming language. Python applications. Python for software development. Features of Python programming language. Implementations of Python. Python career opportunities. Download and install Python and its components. Python language syntax - modes of programming in Python. Interactive mode programming. Script mode programming. Creating Python programme file. Python identifiers. Python keywords. Lines and indentation. Spilt Python statements. Join Python statements. Writing code blocks. Comments in Python and quotation in Python. Python keywords and identifiers. Python comments - purpose/use of comments in computer programming, comments for understanding Python code, Python comment syntax, Python single line comment, multiline comment in Python, and writing Python comments. Python variables. Python data types - implicit declaration of data types, Python numbers (integers, floating-point numbers, and complex numbers), Python strings, Python boolean data type. Python operators - Python arithmetic, comparison/relational operators, increment operators, logical operators, Python identity operators, and Python operators precedence. Python control flow/decision making - simple if structure, if-else structure, if elif structure, and nested if structure. Python control flow – looping and branching. Python numbers - integers, floats, and complex numbers. Python strings. Python lists. Python tuples. Python sets. Python dictionaries. Python arrays. Python user-defined functions. Python built-in functions. Python – modules. Python user input. Python file handling. Python exceptions handling. Regular expressions. Python classes and objects. Python methods. Python constructors. Python inheritance. Python polymorphism. Python abstraction. Python encapsulation. Introduction to Python GUI programming using various GUI frameworks/tool kits

**Lab Work**: Programming assignments involving hands-on practice in the design and implementation of simple database-driven applications.

**Minimum Academic Standard**

Computer Laboratory with Computer Laboratory with different workstations with pre-installed tools for writing Python programs (One Computer to One Student).

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

INS204: **Systems Analysis and Design (**3 Units Compulsory; LH: 30; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in System analysis and design methods to solving real-life problem in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the system analysis and design in addressing real life problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Course Overview**

This course introduces students to System Analysis and Design. System Analysis and Design is an important aspect of Computer Science that designs a blueprint of what and how to go about the implementation of a system.

The goal of this course is to introduce the student to requirement gathering techniques in system analysis and basic modelling techniques for a proper system development.

**Course Objectives**

The objectives of this course are to:

1. describe the system requirement gathering techniques;
2. describe basic data modelling techniques with use cases;
3. describe architectural design for systems;
4. describe process and database design;
5. show the importance of user interface design; and
6. describe the detailed process of creating a full-fledged analysis and design for a system through its requirements.

**Learning Outcomes**

At the end of this course. students should be able to:

1. create system requirements gathering techniques from different case scenarios;
2. explain data modelling techniques (entity relationship modelling, data flow diagrams) and apply the knowledge on a project;
3. explain system architectural design using a project as a case study;
4. explain process and database design using a project as a case study;
5. explain the user interface design and be able to come up with one for a given project; and
6. analyse and design a system using all the working principles learnt during the class interactions.

**Course Contents**

Structured approach to analysis. Design of information systems for businesses. Software development life cycle. Structured top-down and bottom-up design. Dataflow diagramming. Entity relationship modelling. Computer aided software engineering. Input and output. Prototyping design and validation. File and database design. Design of user interfaces. Comparison of structured and object-oriented design.

**Lab Work**: Practical exercises on software development life cycle (SDLC) activities with different case studies. Use of different information systems case studies to apply the knowledge of structured top-down and bottom-up design. Dataflow diagram and entity relationship models.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

Centre for Entrepreneurial Development Studies

University Wide Course for

All Programmes

**COV-ENT221:** **Agripreneurship (Agriculture and Entrepreneurship)** (1Unit Compulsory; PH: 45)

**Senate Approved Relevance**

Covenant University (CU) is fashioned towards producing graduates with sound knowledge and a broad understanding of the scope and contents of entrepreneurship. This course is a branded course targeted at producing the graduates that we envision. CU graduates would have the right professional attitudes, ethics and skills in entrepreneurship that would enable them to be creative in tackling business problems. The students will further be exposed to other branded programmes such as Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of CU graduates. It thus assists them to be very relevant in all areas of the business system and national economy, including handling the challenges of the changing business environment.

In accordance with the University’s vision of Raising a New Generation of Leaders, we seek to empower our graduates to become major players and job creators in the field of agriculture. This course is deliberately crafted to produce future agripreneurs who will leverage on the business potentials in the agricultural sector to become major actors in the actualisation of sustainable development goals.

**Overview**

This course has been specially designed to train and equip potential graduates with skills, not only to be able to manage their own agribusiness ventures in future, but also to become well-trained corporate entrepreneurs in their chosen industry. The curriculum of this course is packaged with action - oriented modules for practical research, accessing the resources for starting and managing agricultural or agro-allied businesses as well as interactive sessions involving direct learning from agricultural practitioners.

The course is flexible and well-structured to accommodate all students irrespective of their academic discipline comprising social sciences and humanities, arts, engineering, science and business background. The main goal of the course is impart the students with the applied knowledge of entrepreneurial process in agriculture namely, planting of leafy vegetables, fish farming and processing of palm oil.

**Objectives**

The specific objectives of the course are to:

1. demonstrate what is meant by ‘Agripreneurship’ and expose students to various branches of Agripreneurship;
2. demonstrate the practical steps involved in planting leafy vegetables;
3. analyse different forms of fish behaviour;
4. demonstrate different means of creating wealth through fish farming;
5. demonstrate the activities involved in processing of palm oil; and
6. analyse different stages involved in marketing of agricultural produce;

**Learning Outcomes**

On completion of this course, the student should be able to:

1. explain the meaning of ‘agripreneurship’ and discuss various branches of agripreneurship;
2. demonstrate the practical steps involved in planting leafy vegetables;
3. manage different forms of fish behaviour by identifying the causes of such behaviour and the appropriate remedies;
4. create wealth through different entrepreneurial processes in fish farming;
5. demonstrate the activities involved in the production of palm oil; and
6. segment, target and position the oil palm for sales through appropriate marketing strategies.

**Course Contents**

Introduction to Agripreneurship. Land preparation and planting of leafy vegetables. Weed control and thinning. Palm oil value chain. Why farms and agro-allied ventures fail. Harvesting and marketing of leafy vegetables. Introduction to fish farming. Potentials in fish farming. Fish behaviours; causes and remedies. 3 Ms of creating wealth in fish farming. Aquarium management. Marketing of fresh and processed fish. Processing of palm oil. Writing of business plan for agribusiness.

**Minimum Academic Standard**

Farm land and oil palm processing facilities

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

COV-TMC221: **Personal Development and Capacity Building** (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

Personal Development/Capacity Building focuses on the process of continuous learning in the process of achieving sustainable success. From the Biblical perspective, the course discourages the notion that any stage of education is exclusive; instead, a successful person must continue to evolve to respond adequately to the ever-changing society.

The course aims to expose students to the vital requirements of vision and mission in the quest for success. Students will learn the importance of focus in setting and achieving their goals. Further, the course enlightens students on the need to develop and maintain a personal brand to stand out and become top-of-the-mind personalities. They will also cultivate a value for mentorship.

**Objectives**

The specific objectives of the course are to:

i. identify the need for personal motivation;

ii. explain the importance of lifelong learning;

iii. discuss the values of having a personal vision and mission;

iv. discuss the role of focus in the pursuit of vision;

v. identify ways to set and achieve goals effectively;

vi. identify the benefits of setting boundaries and building connections when appropriate;

vii. explain the benefits of effective personal branding; and

viii. highlight the role of mentors in the process of personal development.

**Learning Outcomes**

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

1. identify at least four (4) needs for personal motivation;
2. explain ten (10) importance of lifelong learning;
3. discuss at least seven (7) values of having a personal vision and mission;
4. discuss in clear terms the role of focus in the pursuit of vision;
5. identify at least five (5) ways to set and achieve goals effectively;
6. identify at least five (5) benefits of setting boundaries and building connections when appropriate;
7. explain the six (6) benefits of effective personal branding; and
8. highlight the role of mentors in the process of personal development.

**Course Contents**

Understanding personal development/capacity building. Understanding self-motivation. Positive and creative thinking. Following personal vision and mission. Essentials of lifelong learning. Empowerment for focus. Drive and passion for personal development. Goal setting and personal empowerment. Building boundaries and bridges for personal development. Personal branding and marketing for exploits. Standing on the shoulders of giants.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility

**Covenant University, Ota**

African Leadership Development Centre

University-Wide Course

Diploma in Leadership Development

**COV-DLD221: Dynamics of Leadership Development** (1 Unit Compulsory; PH: 45)

**Senate Approved Relevance**

The Diploma in Leadership Development (DLD) programme is designed to produce graduates with a well-grounded knowledge of the concepts of leadership and its application to the array of African and global leadership challenges. The programme offers the redefinition of leadership by emphasising that it is a function of the feat achieved in people’s fields that make them a reference point rather than the position they occupy. DLD is one of the custom-made courses at Covenant University that develop the unique capacity in students to emerge as graduates that go beyond identifying problems to solving them, go beyond the narratives of the blame game to offering expert and intellectual engagements, and go beyond recycling ideas to creating innovative alternatives that are efficient and effective. Consequently, this programme, offered across all the academic departments of the university, will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with sound mental reasoning to pursue and excel in postgraduate studies.

**Overview**

Dynamics of Leadership Development focuses on the forces or properties that stimulate growth, development, or change in the leadership process. It provides an in-depth exploration of specific determinants of leadership outcomes and how students can deliberately engage them for effectiveness.

The course aims to expose students to the roles of apprenticeship and mentorship in leadership as well as the fundamental forces that propel growth in leadership capacity building. Leadership growth factors such as preparation, focus, lifelong learning, humility, character, courage, creativity, innovation and emotional intelligence will be learnt by students.

**Objectives**

The specific objectives of the course are to:

1. identify the dynamics of leadership;
2. discuss the relationship between leadership and followership;
3. discuss the benefits of lifelong learning in the leadership process;
4. examine the role of character in sustaining leadership results;
5. highlight the benefits of courage in executing leadership tasks;
6. identify how spirituality can enhance corporate leadership; and
7. differentiate between the output of a prepared leader and an accidental leader

**Learning Outcomes**

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

1. identify at least seven (7) dynamics of leadership;
2. discuss five (5) relationships between leadership and followership;
3. discuss six (6) benefits of lifelong learning in the leadership process;
4. examine five (5) roles of character in sustaining leadership results;
5. highlight ten (10) benefits of courage in executing leadership tasks;
6. identify how spirituality can enhance corporate leadership; and
7. differentiate between the output of a prepared leader and an accidental leader

**Course Contents**

Introductory lecture: Dynamics of leadership development. Leadership and biographical studies. Leadership: Apprenticeship and discipleship. Leadership development: The force of preparation. Leadership development: The role of focus. The force of lifelong learning. Leadership development: The force of character. The role of spirituality in corporate leadership. Leadership development: The force of courage. Leadership Development: The force of personal value system. Making global impact through service. Leadership development: The force of emotional intelligence.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC311: **Internet Programming (**2 Units Compulsory; LH: 15; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Information Systems, who are highly skilled in creating web applications and internet programming in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Course Overview**

Internet Programming is a web programming language for dynamic web pages construction and design. The emphasis lies on standardized HTML and CSS to create structure and appearance. The course also covers basic JavaScript to create a dynamic behaviour on web sites. Other parts that are covered are availability. responsive design and validation of web pages.

The goal of the course is to expose the undergraduate Computer Science students to the fundamental concepts of creating web applications and internet programming. The emphasis is laid on equipping the Computer Science students with the knowledge of internet programming for dynamic web applications.

**Course Objectives**

The objectives of this course are to:

1. describe implementation details involved in creating a basic web page with HTML, CSS and JavaScript;
2. describe what it takes to develop a fully functional website. and also introduce the concept of web page deployment;
3. briefly introduce the use of existing packages to create web-based projects;
4. describe the use of external data in creating web pages;
5. describe states and transitioning between states in JavaScript;
6. describe visualisations as it relates to creating web pages with well-rounded UI/UX ideas;
7. explain the concept of developing cross-platform applications;
8. describe REST and RESTful applications;
9. describe web sockets for multiple synchronous access to a shared dataset; and
10. describe the use of Git Repositories for modern-day web-based project development.

**Learning Outcomes**

At the end of this course. students should be able to:

1. structure and implement web pages using html/css and javascript;
2. develop and deploy a fully functioning website on a web server;
3. use existing packages to create web-based projects;
4. create webpages that function using external data;
5. develop javascript applications that transit between states;
6. create visualizations in accordance with ui/ux theories;
7. develop fully working applications that can be used on cross-platforms;
8. implement a restful backend API for storing and retrieving data via ajax calls;
9. use web sockets to allow multiple synchronous access to a shared dataset; and
10. use of Git Repositories for modern-day web-based project development.

**Course Contents**

Basics of HTML and creating webpage and websites. Styling a website: Learn and practice the fundamentals of CSS to add beautiful styling to your webpages. Fundamentals of JavaScript: syntax, variables, conditionals, and functions. More JavaScript techniques and features including arrays, looping. and objects. Interactive JavaScript websites:Document object model, the interface between JavaScript and HTML elements. Combining HTML CSS. and JavaScript into exciting interactive sites. Intermediate JavaScript: Learn techniques to extend JavaScript knowledge including reusable classes. Splitting code into modules and making HTTP requests in JavaScript. Git and GitHub fundamentals. Integrating Git and GitHub to manage versions of your projects using Git branches. Building front-end applications with react: Build dynamic and powerful web apps using react.js. JavaScript back-end development: Learn how to create back-end servers using express.js framework. Creating APIs in JavaScript using the popular express.js framework. SQL and databases for web development: SQL fundamentals needed to be a successful full-stack web developer. Building a persistent API: Node-SQLite to connect JS and SQL in web apps. Building your first fully-integrated back-end application. Fundamentals of test-driven development to create reliable full-stack JavaScript web applications.

**Lab Work**: Programming assignments involving hands-on practice in the design and implementation of simple websites and applications, including building of front-end applications with react, building of dynamic and powerful web apps using react.js. Back-end development using JavaScript. Creating back-end servers and APIs in JavaScript using the popular express.js framework.

**Minimum Academic Standard**

Computer Laboratory with different programming languages (One Computer to One Student).

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC313: **Theory of Computing and Formal Languages (**2 Units Compulsory; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in computational and algorithmic approach to solving real-life problem. The computer science graduates from Covenant University who took this course will be equipped with theoretical aspects of solving problems, designing automated machines such as compilers and other aspects of computational processing. Since the focus is to raise graduates that can build computational tools for solving real-life problems, understanding the theoretical foundation of automata theory and formal languages will put them in good stead towards achieving that which is in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like business, medical, educational, agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

Automata Theory and Formal Languages is a course that seeks to expose students to the fundamental mathematical properties of computer hardware, software, and certain applications thereof. In studying this subject, students will understand the fundamental theoretical ideas, especially the concept of context free grammars needed to build new programming languages and compilers for specialized applications. Regular expressions are also very powerful ideas that students learn for computer applications like string processing and pattern matching.

The goal of this course is to acquaint students with the fact that languages fall into various classes, according to their complexity. Also to help develop mathematical and logical models that run efficiently and to the point of halting.

**Objectives**

The objectives of the course are to:

1. describe the mathematical preliminaries that are building blocks of the core concepts to be studied in the course;
2. describe the concept of automata and demonstration of both types of automaton are equal;
3. describe and demonstrate the regular expressions as a tool for elegantly describing acceptable languages of a machine;
4. describe the concept of grammars and their relevance in understanding the basics of programming language design;
5. describe Turing machines as the automata for handling the most complex language and also the basis of every modern computer; and
6. describe how to implement with a desired programming language, and apply the theoretical concepts learnt in this course to relevant computational tasks

**Learning Outcome**

On completion of the course, students should be able to:

1. explain the basic building blocks of the concept of automata theory;
2. explain what automata are and their relevance in the field of computing;
3. explain the relevance of regular expressions and apply them to solve some computational problems such as string processing and implementation of automata for languages;
4. explain the different types of grammars and the application of context-free grammars in the design of compilers and other aspects of computing with a heavy reliance on the application of grammars;
5. describe turing machines as the automata for handling the most complex language and also the basis of every modern computer; and
6. implement with a desired programming language, and apply the theoretical concepts learnt in this course to relevant computational tasks.

**Course Contents**

Sets. Strings. Languages. Finite automata. Deterministic finite automata (DFA). Non-deterministic finite automata (NFA). Conversion of NFA to DFA. Regular expressions. Building regular expressions. Application of regular expressions to pattern matching and other string processing tasks. Closure properties. Minimization of deterministic finite automata. Non-regular languages. Pumping lemma. Grammars. Chomsky hierarchy. Context-free grammars (CFGs). Push-down automata (PDA). Equivalence of PDA and CFG. decidability/undecidability theory. Turing machine. Church-turing thesis.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC315**:** **Operations Research** (2 Units Compulsory; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science. who are highly skilled in computational and algorithmic approach to solving real-life problem in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS). Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business. Medical. Educational. Agriculture. etc. In essence. we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

Operations research is an interdisciplinary branch of applied mathematics and formal science that uses methods like mathematical modelling, statistics, and algorithmsto arrive at optimal or near optimal solutions to complex real life problems. The objective of operation research problem is to maximize profit and minimize cost. Achieving this objective takes several iterative processes.

The goal of the course is to expose the undergraduate computer science students to the fundamental concepts and models of operation research. The emphasis is laid on equipping the computer science students with the knowledge and models of operation research, for easy implementation of the processes to save time and cost.

**Objectives**

The objectives of the course are to:

1. define operation research;
2. describe the steps for solving operation research problems;
3. describe how to formulate real-life problems such as linear programming model;
4. formulate real-life problems with linear programming model;
5. describe the graphical and simplex methods for solving operation research problems;
6. describe the applicability of linear programming, transportation problems, assignment problems and network analysis to some real-life problems;
7. describe how to solve inventory control management problems with practical examples;
8. describe how to solve project management problems with practical examples; and
9. implement the problem solution models with any programming language of choice.

**Learning Outcomes**

On completion of the course students should be able to:

1. explain operation research;
2. describe the steps for solving operation research problems;
3. describe how to formulate real-life problems such as linear programming model;
4. formulate real-life problems such as linear programming model;
5. use the graphical and simplex methods for solving operation research problems;
6. apply linear programming, transportation problems, assignment problems and network analysis to some real-life problems or task;
7. solve inventory control management problems with practical examples;
8. solve project management problems with practical examples; and
9. implement at least one of the operation research problem solution models with any programming language of their choice.

**Course Contents**

Overview of the operation research modelling approaches. Linear programming model and its assumption. Formulation of real-life problems as linear programming model. Graphical method. Simplex method with more than two variables. Two phase and M method of simplex method. Transportation problem formulation. Basic feasible (BF) solution of the transportation problem. Optimality test for transportation BF solution. Iteration with MODI and stepping stone method. Assignment problem formulation and solution. Shortest-path problem. Minimum spanning tree problem. Project network and construction of project network. Project planning and control with critical path method (CPM). Project planning and control with programme evaluation and review technique (PERT). Project planning and control with earliest and latest times. Crashing of projects. Introduction to inventory control management. Objectives of inventory. Basic functions of inventory. Types of inventory. Factors affecting inventory. Deterministic single item inventory model. Economic order quality model. Economic production quantity model. Price discounts model. Dynamic demand models. Deterministic multi-items inventory mode (unknown cost structure model. known cost structure model). Probabilistic inventory models (single period probabilistic model. single period discrete probabilistic demand model). Implementation of the models using any programming language and deployment.

**Minimum Academic Standard**

Computer Laboratory with Computer Laboratory with different workstations with pre-installed tools and software packages needed for the implementation of some Operations Research solution models (One Computer to One Student).

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC316: **Python Programming Language II** (2 Units Compulsory; LH: 15; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in programming approaches to solving real-life problem in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the problem solving in addressing real life problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Course Overview**

This course introduces students to Python programming with machine learning and libraries. Python Programming is intended for software engineers, Information systems analysts, program managers and user support personnel who wish to learn the programming language. It is intended for students with little or no programming background

The goal of this course is to extend students’ knowledge of Python Programming to Machine learning algorithms, desktop application, web application and plots. Also to understand the use of available libraries in Python.

**Course Objectives**

The objectives of the course are to:

1. describe Python frameworks for desktop applications;
2. describe database access and manipulation with Python;
3. describe Python frameworks for software and web development;
4. describe Python Libraries for machine learning and Deep learning;
5. describe how to use Python libraries for plotting; and
6. demonstrate how to build desktop applications, machine learning and deep learning application.

**Learning Outcomes**

At the end of this course, student should be able to:

1. explain the Python framework for desktop applications;
2. create back-end database for accessing with Python application at the front-end;
3. create web application with Python;
4. identify and call Python libraries like for different applications like machine learning and deep learning algorithms;
5. use Python for plotting and visualization; and
6. build a desktop application, machine and deep leaning application with Python.

**Course Contents**

Introduction to Python frameworks for desktop applications - wxPython, Tkinter, Kivy, PyQt. Introduction to database access - for database programming. Python multi-threading. Creating desktop applications with database. Python frameworks for software/web development – Django, Flask, CherryPy, Pyramid, FastAPI. Introduction to Python libraries and frameworks for machine learning. NumPy library. Scipy library. Scikit-learn library. Pandas library. Matplotlib. Tensor flow. Keras Library. PyTorch. Python networking programming. Python GUI programming using various GUI frameworks/tool kits. Project works: Desktop application with database access and application of Python libraries for machine learning and deep learning processes.

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**Lab Work**: Programming assignments involving hands-on practice in the design and implementation of simple database-driven applications.

**Minimum Academic Standard**

Computer Laboratory with Computer Laboratory with different workstations with pre-installed tools for writing Python programs (One Computer to One Student).

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

COV-TMC311: **Man in Spiritual and Socio-Political Contexts**  (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

Man in Spiritual and Socio-Political Contexts is designed to develop a sense of social responsibility in students by showing how a spiritually sound person can also be socially valuable. Based on the Biblical wisdom that Christians are ambassadors of Christ on earth, this course explores how students can positively live and impact their societies without losing their identity or sense of responsibility to God.

The course aims to create awareness in the students to represent Christ by being responsible to the laws of their nations. They will learn their roles nationally and globally and how they can actively participate in the leadership of their society. Managing societal pressure and conflict is vital in ensuring peaceful co-existence in a pluralistic society.

**Objectives**

The specific objectives of the course are to:

i. identify why man does not live in isolation;

ii. describe man’s need for social interactions;

iii. discuss the importance of being generous towards other people;

iv. identify ways to manage conflict and diversity;

v. highlight the roles of a responsible citizen;

vi. describe ways to manage societal pressures;

vii. discuss ways to become a valuable international citizen; and

viii. discuss the importance of good political consciousness.

**Learning Outcomes**

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

i. identify four (4) reasons man does not live in isolation;

ii. describe in precise terms man’s need for social interactions;

iii. explain five (5) importance of being generous towards other people;

iv. identify six (6) ways to manage conflict and diversity;

v. highlight at least ten (10) the roles of a responsible citizen;

vi. describe with illustrations ways to manage societal pressures;

vii. discuss any five (5) ways to become a valuable international citizen; and

viii. discuss the importance of good political consciousness.

**Course Contents**

Introductory lecture: The spiritual man in socio-political contexts. Responsible citizenship. The creationism account. Charity and giving. Man in God's master plan. Managing social relationships. Societal influences and pressures. Conflict and diversity management. Political consciousness. International citizenship.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC411**:** **Machine Learning I** (3 Units Compulsory: LH: 30; PH: 45)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in machine learning, a tool that has become highly relevant and applicable in almost every facet of human life: academic world, solving business problems, technology, manufacturing, health sector, etc. Therefore. equipping our students with a course like this will make the students potential graduates ready to solve problems in both academia and the industry which is in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

Machine Learning algorithms have their roots in mathematical and statistical models and the goal of learning the course is to understand the art of building computational methods with the ability to learn from experience through data. It is a very prominent sub-field of artificial intelligence with three distinct approaches to solving tasks: supervised learning. unsupervised learning and reinforcement learning.

The goal of this course is to program computers to use example data or experience to solve a given problem and also to achieve a thorough understanding about the nature of learning process.

**Objectives**

The objectives of the course are to:

1. describe the different machine learning paradigms and how to distinguish between their different purposes;
2. describe the machine learning pipeline;
3. describe the differences between classification and regression tasks with relevant class examples;
4. demonstrate the applicability of classification and regression algorithms for classification and regression tasks respectively;
5. explain and demonstrate the concept of association rule mining with relevant examples where they are needed;
6. describe unsupervised learning tasks such as dimensionality reduction and clustering techniques with adequate examples for better understanding;
7. describe neural networks as a major supervised learning tool with focus on the introductory concepts, mathematical intuition, and applicability of neural networks; and
8. demonstrate how to effectively implement and deploy an application that uses machine learning to solve some tasks.

**Learning Outcomes**

On completion of the course. students should be able to:

1. explain the different paradigms of machine learning;
2. explain the machine learning pipeline for the purpose of effectively deploying a machine learning application;
3. explain the concepts of classification tasks in contrast to regression tasks and correctly identify which algorithm to implement when faced with any problem pertaining to each task;
4. implement several classification and regression algorithms to solve appropriate machine learning problems
5. explain the concept of association rule mining as a unique aspect of machine learning with the purpose of finding hidden frequent patterns and associations among entities within data;
6. explain to a great detail, some unsupervised learning tasks and have the technical know-how of which one to apply when faced with a problem;
7. explain the fundamentals of neural networks and implement them for solving classification and regression problems; and
8. develop and deploy workable machine learning applications

**Course Contents**

Introduction to machine learning paradigms. Machine learning pipeline. Data pre-processing. Data cleaning. Data normalization. Dimensionality reduction. Supervised and unsupervised learning. Classification tasks. Regression tasks. Algorithms for classification tasks. Decision trees. The k-nearest neighbour algorithm. Naive Bayes classifier. Algorithms for regression tasks. Regression trees. Multiple linear regression. Logistic regression. Neural networks I. Neural networks II. Multi-class classification. Random forest. Gradient descent. Principal component analysis (PCA). Support vector machine. Association rule mining. Clustering algorithm. Application of machine learning algorithms to real life problem scenario in different domains.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC413**: Compiler Construction** (2 Units Compulsory; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in computational and algorithmic approach to solving real-life problem. Graduates of Covenant University properly equipped with the knowledge of creating compilers can one day design one for a new programming language which could potentially become a very popular programming language like C, C++, Java and Python in fulfilment of the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

In studying Compiler Construction. students will see the theory behind different components of a compiler. the programming techniques used to put the theory into practice, and the interfaces used to modularize the compiler. Concepts like automata theory, regular expressions, context-free grammars, parsing, lexical analysis and syntax analysis form the bedrock of what will be learnt and the potential goal is to equip students to eventually design a compiler at the end of the course or during their lifetime as practitioners in the field of computing.

The goal of this course is to teach the students the basic techniques that underlie the practice of Compiler Construction. Also to introduce the theory and tools that can be employed in order to perform syntax-directed translation of a high-level programming language into an executable code.

**Objectives**

The objectives of the course are to:

1. describe the basis of compilers and the importance of knowing how to build one;
2. describe lexical analysis and demonstrating the steps in building a lexer for a language;
3. describe syntax analysis and the importance of syntax trees;
4. discuss the various techniques of parsing; top-down, bottom-up, and LR Parsing;
5. describe and demonstrate the steps in the design and implementation of a basic compiler; and
6. describe the principles of code optimization.

**Learning Outcomes**

On completion of the course. students should be able to:

1. explain what compilers are and the stages of building one;
2. explain lexical analysis as an important stage of building a compiler and implement a simple lexer;
3. explain syntax analysis and the computational process by which a compiler checks the syntax of a written code;
4. explain the concept of syntax trees in determining the acceptability of code expressions based on the grammar of a programming language;
5. implement a basic compiler demonstrating theory-practice mastery of the concepts taught in the class; and
6. explain what it takes to optimize a written code through the compiler.

**Course Contents**

Introduction to compiler design. Data structures required for compiler design principles. Lexical analysis. Regular expressions. Finite automata. Non-deterministic finite automata. Implementing lexers. Syntax analysis. Bottom-up parsing. Top-down parsing. LR parsing. Context-free grammars. Syntax tree. Semantic analysis. Symbol tables. Type checking. Translation to intermediate code. Implementation of a basic compiler. Code optimization.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

Centre for Entrepreneurial Development Studies

University-Wide Course

**COV-ENT411:** **Product Development and Commercialisation** (1 Unit Compulsory; LH: 0; PH: 45)

**Senate Approved Relevance**

Covenant University (CU) is fashioned towards producing graduates with sound knowledge and a broad understanding of the scope and contents of entrepreneurship. This course is a branded course targeted at producing the graduates that we envision. CU graduates would have the right professional attitudes, ethics and skills in entrepreneurship that would enable them to be creative in tackling business problems. The students will further be exposed to other branded programmes such as Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of CU graduates. It thus assists them to be very relevant in all areas of the business system and national economy, including handling the challenges of the changing business environment.

In accordance with the University’s vision of Raising a New Generation of Leaders, we endeavour to produce graduates that are job creators and not just potential employees. Apart from enhancing the commercialisation knowledge of the students, the graduates of Covenant University would also be simultaneously prepared to become corporate entrepreneurs.

**Overview**

This course is designed to expose the undergraduate students to product development activities such as achieving problem-solution fit and achieving product-market fit. This course examines the strategies and processes used by leading companies for successful new product development. It equips the students with the necessary skills and overarching knowledge in technology transfer and commercialisation processes. The course will further enlighten the students about the start-up laws as well as business formation and registration procedures.

The development and implementation of new products and services is a core business function for many organisations. The goal of this course is to develop a solid understanding of product and service development from a strategic, entrepreneurial and marketing perspective. This course builds on knowledge of design thinking and complements this knowledge by developing a deeper understanding of start-up laws and commercialization processes. Real-world examples will be presented and the students will be practically involved in the applications of these concepts and techniques.

**Objectives**

The specific objectives of the course are to:

1. explain what is meant by ‘running lean’ and expose students to various forms of lean methodologies;
2. discuss the nature of product research and explain how different types of product research can be conducted;
3. describe the processes involved in technology transfer and commercialisation;
4. describe the roles played by National Office for Technology Acquisition and Promotion (NOTAP) in patenting inventions; and
5. appreciate the commercialisation policy of the university and its applications.

**Learning Outcomes**

On completion of this course, the student should be able to:

1. explain the meaning of running lean and develop products that will pass the necessary innovative parameters such as problem-solution fit and product-market fit;
2. discuss the nature of product research and conduct different types of product research;
3. describe the practical steps involved in technology transfer and commercialisation;
4. describe, in specific term, the roles played by National Office for Technology Acquisition and Promotion (NOTAP) in patenting inventions; and
5. leverage on the commercialisation policy of the university for business support such as training, funding, market access as well as equity returns.

**Course Contents**

Introduction to running lean. Achieving problem-solution fit. Achieving product-market fit. Business model development. Technology transfer and commercialization process. Patents and design acts in Nigeria. Roles of National Office for Technology Acquisition and Promotion (NOTAP). Commercialisation policy in Covenant University. New product research. New product launch. Business formation and registration procedures. The Nigerian Start-up Act.

**Minimum Academic Standards**

Business hub and viable commercialisation policy

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

COV-TMC411: **Self-Management Techniques** (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

Self-Management Techniques is designed to teach students how to manage their greatest asset- themselves. People tend to develop the capacity to manage their jobs, families and even others without paying attention to creating a healthy personality. Given that the major hindrance to a purposeful living is embedded in individuals, this course aims to examine the various methods, skills and strategies necessary to manage self for destiny actualization.

The course will explore the need for timely actions in pursuing identified goals, the discipline required, considerations to have while making decisions, appropriate time management techniques to adopt, and going beyond self-confidence to God-confidence.

**Objectives**

The specific objectives of the course are to:

i. define self–management;

ii. identify the importance of self-management to purposeful living;

iii. identify self-management skills, methods and strategies;

iv. highlight ways to manage procrastination;

v. discuss how to make good decisions;

vi. explain how to manage stress;

vii. explain the process of self-evaluation; and

viii. apply Self-management skills, methods and strategies in their daily life.

**Learning Outcomes**

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

i. define self–management;

ii. identify five (5) importance of self-management to purposeful living;

iii. state at least three (3) self-management skills, methods and strategies;

iv. highlight six (6) ways to manage procrastination;

v. discuss the process of making good decisions;

vi. explain four (4) ways to manage stress;

vii. vividly explain the process of self-evaluation; and

viii. apply Self-management skills, methods and strategies in their daily life.

**Course Contents**

Introductory lecture: Self-mangement techniques. Decision-making skills. Grace and determination for self-discipline. Time management. Goal setting and planning skills. The power of focus. Anti-procastination strategies. Self-evaluation strategies. God-confidence and self-confidence. Stress management. Safety measures and precautions. The body segment: Safety measures and precautions II. Safety measures and precautions II.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

**Covenant University, Ota**

African Leadership Development Centre

University-Wide Course

Diploma in Leadership Development

COV-DLD411: **Leadership Skills, Styles and Settings**  (1 Unit Compulsory; PH: 45)

**Senate Approved Relevance**

The Diploma in Leadership Development (DLD) programme is designed to produce graduates with a well-grounded knowledge of the concepts of leadership and its application to the array of African and global leadership challenges. The programme offers the redefinition of leadership by emphasising that it is a function of the feat achieved in people’s fields that make them a reference point rather than the position they occupy. DLD is one of the custom-made courses at Covenant University that develop the unique capacity in students to emerge as graduates that go beyond identifying problems to solving them, go beyond the narratives of the blame game to offering expert and intellectual engagements, and go beyond recycling ideas to creating innovative alternatives that are efficient and effective. Consequently, this programme, offered across all the academic departments of the university, will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with sound mental reasoning to pursue and excel in postgraduate studies.

**Overview**

Leadership Skills, Styles and Settings is designed to expose students to the skills necessary for effective leadership. Leaders are unique in their approaches. The specific style that is adopted under specific circumstances can determine the degree of success or failure. Hence, the course teaches students various styles of leadership and how to identify the most appropriate one or combination.

The goal of the course is to introduce students to different settings of leadership and how each setting would require its appropriate skill and style. In this course, students will learn the critical skills required for effective leadership, including Conceptual Skills, People Skills, Communication Skills, Technological and Financial Skills. Students will also learn common leadership styles and settings.

**Objectives**

The specific objectives of the course are to:

1. identify specific leadership skills required for effectiveness;
2. discuss the characteristics of common leadership styles;
3. determine the appropriate style of leadership to adopt based on scenarios;
4. discuss common leadership settings;
5. explain how settings can influence leadership styles; and
6. apply leadership skills to human relations, communication, technology and finances.

**Learning Outcomes**

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

1. identify five (5) specific leadership skills required for effectiveness;
2. discuss seven (7) characteristics of common leadership styles;
3. apply the appropriate style of leadership to adopt based on scenarios;
4. discuss three (3) common leadership settings;
5. explain how settings can influence leadership styles; and
6. apply leadership skills to human relations, communication, technology and finances;

**Course Contents**

Introductory lecture: Leadership skills and styles. Leadership and communication skills. Digital literacy and leadership. Leadership and human relations. Financial intelligence and leadership effectiveness. Leadership effectiveness for career development. Styles of leadership I: Autocratic, laissez-faire, democratic and transactional, visionary, servant and transformational. Strategic leadership: Developing leadership strategies in the corporate world. Styles of leadership II: Team, strategic and cross-cultural. Entrepreneurial leaders: Leadership for global relevance. Business leadership: Building a global leadership brand.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC422**:** **Computational Science and Numerical Method** (2 Units Compulsory; LH: 30: PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of computer science, who are highly skilled in computational science and numerical methods in pursuing careers in fields such as engineering, physics, computer science and applied mathematics to solving real-life problem in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

This course is a fundamental introduction to numerical computation. It introduces students to how problem that cannot be solved analytically can be otherwise solved computationally. The course provides an introduction to basic numerical methods and computer programming for the solution of a number of classes of scientific problems. This course provides a foundation in numerical approximations to analytical methods – these techniques are essential for solving problems by computer. An indicative list of methods is: linear equations, zeros and roots, least squares and linear regression, eigenvalues and eigenvectors, errors and finite differences, linear programming, interpolation and plotting functions, numerical integration, numerical differentiation, solutions to ordinary differential equations using numerical methods.

The goal of this course is to present the fundamentals of scientific computing with the implementation of the key concepts of numerical methods and apply the methods for solving research and applied tasks.

**Course Objectives**

The specific objectives of the course are to:

1. descrbe the concepts of computation science;
2. describe the problems that cannot be solved analytically;
3. discuss how to apply relevant numerical techniques to solve problems that cannot be solved analytically;
4. describe how to use mathematical techniques and analysis to model physical behaviour;
5. describe how to solve advanced problems using appropriate mathematical tools;
6. describe how to translate problems into mathematical statements and apply their knowledge to obtain more precise solutions as appropriate; and
7. expose the students to computational tools and implementation of algorithms used to solve numerical problems with Python.

**Learning Outcome**

On completion of this course. students should be able to:

1. explain what computational science entails
2. identify problems that cannot be solved analytically;
3. apply relevant numerical techniques to solve problems that cannot be solved analytically;
4. use mathematical techniques and analysis to model physical behaviour;
5. solve advanced problems using appropriate mathematical tools;
6. translate problems into mathematical statements and apply their knowledge to obtain more precise solutions as appropriate; and
7. use computational tools and implement algorithm used to solve numerical problems with Python libraries.

**Course Contents**

Introduction to computational science. Real numbers. Floating-point numbers. Fixed-point numbers. Condition numbers. Sources of errors. Errors in the input data: rounding errors and truncation errors. Floating point addition. Floating point multiplication and floating point division. Accumulated errors. Approximation and interpolation. Least square approximation. Inner products. Normal equations. Convergence. Using computational tools for problem solving (Maxima, Matlab, Mathematica). Introduction to Python libraries for numerical computation.. Implementation of algorithms used to solve numerical problems

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

INS202: **Human-Computer Interaction (HCI)** (2 Units Compulsory; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in Human Computer Interaction designs for solving real-life problem. Graduates of Covenant University properly equipped with the knowledge of Human-Computer Interactioncan one day design Human centred Software in fulfilment of the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life software interface problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

HCI is a relatively new field within the Computer Science discipline. Since it is expected that graduates of Covenant University are equipped with relevant and up-to-date knowledge with respect to their field of endeavour. teaching HCI to students’ fits in the university’s vision concerning the aspect of producing graduates that are ready to tackle the challenges in their field today.

**Course Overview**

Human Computer Interaction is a multidisciplinary field that involves computer science and especially cognitive science since it has been touted that interaction of humans with computers should resemble human-to-human interactions for ease of use.

The goal of this course is to teach the student how to design systems that facilitate interaction between the users (humans) and the computer.

**Course Objectives**

The objectives of this course are to:

1. describe the foundations and underlying concepts of human computer interaction;
2. describe the principles of human-computer interaction;
3. describe the foundational/ground work and the emergence of human computer interaction as a field of study;
4. showcase the importance of use feedbacks in human computer interaction systems; and
5. describe how to implement workable human computer interaction systems.

**Learning Outcomes**

At the end of this course. students should be able to:

1. discuss the foundations and concept of the human-computer interaction;
2. explain the principles of human-computer interaction;
3. explain the design and development of the human-computer interaction; and
4. explain the importance of user feedback; and
5. conceptualise and implement a project that evidently showcases the principles of human computer interaction

**Course Contents**

Foundations of HCI. The concept underlying the design of HCI. Principles of GUI. GUI tool-kits. System design methods. User conceptual models and interface metaphors. Human cognitive and physical ergonomics. Human-centred software evaluation and development. GUI design and programming.

**Lab Work:** Illustration of the principles of HCI design. Practice on GUI design and programming. Demonstration of some GUI tool-kits. Practical evaluation of GUIs.

**Minimum Academic Standard**

Computer Laboratory with different workstations with pre-installed tools for developing HCI-related programs (One Computer to One Student).

Covenant University, Ota

Centre for Entrepreneurial Development Studies

University Wide Course for

All Programmes

**COV-ENT421:** **Start-up Growth Strategy** (1 Unit Compulsory; PH: 45)

**Senate Approved Relevance**

Covenant University (CU) is fashioned towards producing graduates with sound knowledge and a broad understanding of the scope and contents of entrepreneurship. This course is a branded course targeted at producing the graduates that we envision. CU graduates would have the right professional attitudes, ethics and skills in entrepreneurship that would enable them to be creative in tackling business problems. The students will further be exposed to other branded programmes such as Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of CU graduates. It thus assists them to be very relevant in all areas of the business system and national economy, including handling the challenges of the changing business environment.

In accordance with the University’s vision of Raising a New Generation of Leaders, the University is expected to provide mentorship and business support to all the businesses formed by the students. As part of the commitment towards such business support, the students shall be trained on how to avoid business failure and manage the strategic issues involved in growing their businesses.

**Overview**

The course provides the students with the tools they need to analyse and evaluate their existing performance. The course will also recommend specific actions that organizations can take to grow their value and avoid common growth pitfalls. In this course, they will learn to determine how best to build value, whether by scaling existing markets, entering established markets or creating new markets through innovation and acquisitions.

This course will expose the students to various case studies of companies that have endured and prospered for centuries by identifying new growth opportunities, adapting, and innovating. The course will also inspire the students to accelerate the ability of their start-ups to acquire and cultivate knowledge that is critical to its future success. The students will also discover why managerial creativity is increasingly important, and how they can leverage growth strategies to help achieve their objectives.

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**Objectives**

The specific objectives of the course are to:

1. demonstrate what is meant by growth strategy by evaluating various growth strategies;
2. demonstrate how vision and mission should be crafted appropriately;
3. analyse different business environment through the use of relevant case studies;
4. discuss the nature of relationship between strategy and structure;
5. analyse strategic issues in managing Innovation; and
6. demonstrate how to develop a business strategy and an action plan for implementation.

**Learning Outcomes**

On completion of this course, the student should be able to:

1. illustrate what is meant by growth strategy by implementing appropriate growth strategy suitable for a particular business situation;
2. craft appropriate vision and mission containing the required basic elements;
3. carry out environmental analysis and provide appropriate recommendations based on the outcomes of the analysis;
4. apply the symbiotic relationship between strategy and structure and recommend strategies to be adopted based on a given business structure or vice versa;
5. demonstrate different ways of managing strategic issues relating to new products or innovation; and
6. develop a business strategy and an action plan for implementation based on the peculiar nature of any given firm.

**Course Contents**

Meaning of growth strategies. Mission and vision statement. Environmental analysis. Strategy and structure. Types of growth strategies. Stakeholder analysis. Competitive advantage. Strategic issues in managing technology and innovation. Implementation and Monitoring of strategic plans

**Minimum Academic Standard**

Business hub/Accelerators lab with business simulation software

Covenant University, Ota

African Leadership Development Centre

University-Wide Course

Total Man Concept

COV-TMC421: **Issues in Marriage and Family Life I** (1 Unit Compulsory; LH: 15)

**Senate Approved Relevance**

The Total Man Concept (TMC) programme is designed to produce spiritually sound graduates with a crystal understanding of the triune nature of man- spirit, soul and body- and how to develop each element of that nature to maturity. The programme is based on Biblical principles and explores man's origin, God’s purpose for creating man, and how to achieve that purpose. The term “man” in this course does not refer to a specific gender; instead, it is a general representation of humankind. TMC is one of the custom-made courses at Covenant University that develops the spiritual, soulish and physical capacity in students to emerge as well-rounded graduates that are ready to face the multidimensional challenges of life. Critical to the vision that birthed Covenant University is the need to raise a new generation of leaders who will constitute the force and agent of change that is critically needed in Nigeria, Africa and the world. The new generation of leaders requires more than academic degrees. They must be equipped with divine resources, mental excellence and physical fitness.

Consequently, this programme is offered across all the university's academic departments. It will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with an all-around capacity to pursue and excel in postgraduate studies.

**Overview**

Issues in Marriage and Family has as its primary objective to introduce students to the context of marriage and family life with a view to understanding the place of preparation in marriage and issues that are vital to making marriage work specifically from a Christian perspective. The course aims to provide a 3600 view to understanding marriage and family in order to open up students in the graduating class to the expectations in marriage and family life.

Issues with respect to the current context of marriage and challenges faced in the 21st century, nationally and globally, will be addressed. The course will present the scriptural and Biblical dimensions for marriage and the foundational role that marriage and families play in society.

**Objectives**

The specific objectives of the course are to:

1. define a Christian marriage;
2. identify steps in preparing for marriage;
3. distinguish between wedding and marriage;
4. discuss types of communication in marriage;
5. highlight the family responsibilities of the couple;
6. identify ways to manage family finance effectively; and
7. explain the process of effective parenting.

**Learning Outcomes**

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

i. define a Christian marriage;

ii. identify at least seven (7) steps in preparing for marriage;

iii. distinguish between wedding and marriage;

iv. discuss the three (3) types of communication in marriage;

v. highlight at least ten (10) family responsibilities of the couple;

vi. identify at least eight (8) ways to manage family finance effectively; and

vii. explain with vivid illustration the process of effective parenting.

**Course Contents**

Introduction to the issues in marriage and family life. Preparing for marriage: Fundamental issues. The Christian marriage. The covenant marital intimacy. Effective communication in marriage. Understanding family responsibilities. Family and spiritual warfare. Handling family finances. Parenting. Roles of family in national and global development.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

**Covenant University, Ota**

African Leadership Development Centre

University-Wide Course

Diploma in Leadership Development

COV-DLD421: **Models and Challenges of Leadership** (1 Unit Compulsory; PH: 45)

**Senate Approved Relevance**

The Diploma in Leadership Development (DLD) programme is designed to produce graduates with a well-grounded knowledge of the concepts of leadership and its application to the array of African and global leadership challenges. The programme offers the redefinition of leadership by emphasising that it is a function of the feat achieved in people’s fields that make them a reference point rather than the position they occupy. DLD is one of the custom-made courses at Covenant University that develop the unique capacity in students to emerge as graduates that go beyond identifying problems to solving them, go beyond the narratives of the blame game to offering expert and intellectual engagements, and go beyond recycling ideas to creating innovative alternatives that are efficient and effective. Consequently, this programme, offered across all the academic departments of the university, will produce graduates poised to rise to the top of any organisation as employees or establish thriving businesses. Graduates will also be equipped with sound mental reasoning to pursue and excel in postgraduate studies.

**Overview**

Models and Challenges of Leadership presents students with positive and negative leadership example from the Bible and the society. In this course, students will learn from the successes and mistakes of biblical, historical and contemporary leaders in diverse leadership settings. They will also be exposed to significant leadership challenges such as change management, corruption, ethnicity, conflict management and governance.

The aim of the course is to enlighten the students on the need to learn from other people’s experiences in their leadership journey. They will also be taught that managing people comes with significant challenges. Therefore, they must learn how to avoid self-doubt when faced with such challenges. The should also develop the essential people skills to excel in leadership.

**Objectives**

The specific objectives of the course are to:

1. define leadership models;
2. identify the types of leadership models;
3. discuss lessons learnt from the success and mistakes of biblical
4. discuss lessons learnt from historical and contemporary leaders; and
5. identify and discuss the significant challenges of leadership.

**Learning Outcomes**

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

1. define leadership models;
2. identify at least five (5) types of leadership models;
3. discuss at least seven (7) lessons learnt from the success and mistakes of biblical
4. discuss at least six (6) lessons learnt from historical and contemporary leaders; and
5. identify and discuss five (5) significant challenges of leadership.

**Course Contents**

Introduction to leadership models and challenges. Leadership challenge of conflict management. Biblical models of leadership. Learning process and effective leadership. Leadership challenge of corruption. Dynamic leadership: Anticipating, managing and leading change. Leadership challenge of maintenance culture. Leadership challenge of time management. Leadership challenge of creativity and innovation. Leadership, business intelligence and performance management. Leadership challenge of ethnocentrism.

**Minimum Academic Standards**

Dedicated audiovisual and multimedia facility.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC424**:** **Machine Learning II** (2 Units Elective; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in machine learning, a tool that has become highly relevant and applicable in almost every facet of human life: academic world, solving business problems, technology, manufacturing, health sector, etc. Therefore, equipping our students with a course like this will make the students potential graduates ready to solve problems in both academia and the industry which is in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Course Overview**

Machine Learning algorithms have their roots in mathematical and statistical models. Machine learning as course will expose the student to the art of building computational methods with the ability to learn from experience through data. It is a very prominent sub-field of artificial intelligence with three distinct approaches to solving tasks: supervised learning. unsupervised learning and reinforcement learning. In this course. deeper concepts like ensemble models. multi-class classification and special types of neural network models are discussed. Ultimately. the goal is to empower students to be ready to tackle various real-world problems that require deeper knowledge of machine learning, both in terms of application and implementation.

The goal of this course is to train a model on historical, labelled data (i.e., data for which the outcome is known) in order to predict the value of some quantity on the basis of a new data item for which the target value or classification is unknown.

**Course Objectives**

The objectives of the course are to:

1. describe the more sophisticated classification algorithms;
2. describe the concept of deep learning and demonstrate the intuition behind the deep learning models;
3. describe the concept of combining the classification and predictive power of similar machine learning models and discuss the relevance of ensembles;
4. describe the concept of multi-label classification;
5. introduce reinforcement learning as an important machine learning paradigm besides supervised and unsupervised learning techniques;
6. describe the main purposes of two deep learning models; recurrent neural nets and convolutional neural nets as the basis for the latest advancements in deep learning models; and
7. demonstrate the implementation of machine learning algorithms for popular computing applications such as speech recognition and image recognition.

**Learning Outcome**

On completion of the course. students should be able to:

1. explain more robust machine learning models such as the support vector machines for non-linear classification;
2. explain deeper machine learning models for more challenging tasks;
3. explain ensemble machine learning models and knowing when to use them;
4. explain the concept of multi-label classification;
5. explain reinforcement learning as another machine learning paradigm and implement some of them with relevant case studies;
6. explain the main purposes of two deep learning models; recurrent neural nets and convolutional neural nets as the basis for the latest advancements in deep learning models; and
7. apply of machine learning models to computational topics such as recommender systems, game playing, and complex decision-making systems.

**Course Contents**

Support vector machines. More neural network models. Recurrent neural networks. Convolutional neural networks. Deep learning. Dropout. Stochastic gradient descent. Adam optimizer. Multi-label classification. Ensemble learning: AdaBoost. Random forests. Stacking. Bootstrapping. Reinforcement learning. Q-learning. Thompson sampling. Speech recognition. Image recognition. Machine learning for vision. Recommender systems. Teaching machines to learn game strategies. Monte Carlo tree search.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC426**:** **Modelling and Simulation** (2 Units Elective; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in modelling and simulation. Consequently. graduates of Covenant University studying this course will be equipped with the necessary skillset to be innovative and analytical in their thinking thereby turning problems into opportunities which is in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

Modelling and Simulation (M & S) is one of the important courses in the field of Computer Science and Technology and its application is found in diverse fields such as physics, chemistry, biology, economics, medicine, computer science, and engineering. M&S is a discipline on its own. The main aim of this course is to introduce fundamental principles and concepts in the general area of modelling and simulation in order to enable students understand the basic elements of simulation use in day-to-day activities, especially in businesses, sciences, and technology industries.

The main aim of the course is to provide the theoretical background, methods, techniques and tools for complex problem solving, with emphasis on the software aspects.

**Course Objectives**

The objectives of the course are to:

1. describe the basic concept surrounding modelling and simulation including the types of modelling;
2. discuss different types of simulation and the advantages of using models;
3. define queuing theory and describe queuing systems; parameters and examples of queuing systems;
4. describe basics probability theories in queuing systems such as Markov processes, birth-death processes, and Poisson processes; and
5. describe the basics of random numbers, random number generation and types of random number as applied to real life problems.

**Learning Outcome**

Therefore. at the end of this course. students are expected to:

1. explain the basic concept of uses and types in modelling and simulation;
2. explain different types of simulation and the advantages of using models;
3. Explain the basic concept of queue system in system’s modelling;
4. explain Markov processes, birth-death processes, and Poisson processes; and
5. explain properties of a good random number generator and how to simulate randomness in computing.

# Course Contents

Basics of modelling and simulation. Type of models. Types of simulations. Advantages of using models. Random numbers. Random number generation. Discrete-event system simulation. Mathematical and statistical models. Simulation design. Experiment design. Modelling of simulation data. Simple theories of queues. Basic probability theories in queuing. Queuing models. Queuing experiments. The purpose of simulation language. Types and examples of simulation languages. Applications of computer simulation.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

COV-CSC428**:** **Computational Biology** (2 Units Elective; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in modelling and simulation. Consequently. graduates of Covenant University studying this course will be equipped with the necessary skillset to be innovative and analytical in their thinking thereby turning problems into opportunities which is in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

**Overview**

This course covers the algorithmic and machine learning foundations of computational biology combining theory with practice. Through a combination of foundational topics in computational biology. and current research frontiers. the course aims to study fundamental techniques. recent advances in the field. and work directly with current large-scale biological datasets.

The goal of this course is to develop a deeper understanding of techniques and concepts used in Computational Biology. The course will strive to focus on a small set of approaches to gain both theoretical and practical understanding of the methods.

**Objectives**

The objectives of this course are to;

1. describe next generation sequencing technologies and the omics;
2. demonstrate the use of sequence alignment algorithms and phylogenetic algorithms for comparative genomics of entire genomes;
3. describe the concept of hidden Markov models and demonstrate their use in bioinformatics;
4. describe gene expression and demonstrate how to analyze gene expression data;
5. demonstrate the use of clustering and classification algorithms in bioinformatics;
6. describe the concept of graph theory and demonstrate its use in analyzing biological networks;
7. demonstrate the use of molecular docking tools for protein structure prediction and protein/ligand binding; and
8. discuss the drug discovery pipeline.

**Learning Outcome**

On completion of the course. students should be able to:

1. explain next generation sequencing technologies and the omics;
2. use sequence alignment and phylogenetic software for comparative genomics of entire genomes;
3. explain hidden Markov models and demonstrate their use in bioinformatics;
4. describe gene expression and analyze gene expression data;
5. apply clustering and classification algorithms to a biological data e.g. gene expression data;
6. explain graph theory and use to analyze a simple biological network e.g. metabolic network;
7. use molecular docking software for protein structure prediction and protein/ligand binding; and
8. explain the drug discovery pipeline.

**Course Contents**

Computational biology and its application: Recap. Genome sequences – sequencing technology and NGS overview. Introduction to omics (proteomics, genomics, metabolomics, transcriptomics, epigenomics, etc). Comparative genomics. Hidden Markov Models (HMMs). Demonstration of the uses of HMMs: sequence analysis, gene finding, classification, multiple sequence alignment, protein structure prediction, and clustering/pattern detection. Gene expression. Methods of measuring gene expression. Expression analysis: Clustering/ classification algorithms. Graph theory methods and algorithms. Network centrality measures. Biological networks. Co-expression networks. Protein interaction networks. Gene regulatory networks. Metabolic networks. Cell signalling networks. Structural bioinformatics. Molecular docking. Protein structure prediction. Drug discovery pipeline.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.

Covenant University, Ota

College of Science and Technology

Department of Computer and Information Sciences

B.Sc. Computer Science

DTS404: **Data Management II** (2 Units Elective; LH: 30; PH: 0)

**Senate Approved Relevance**

The Computer Science programme is fashioned towards producing graduates with adequate knowledge and broad understanding of the basic concepts of Computer Science, who are highly skilled in Data warehousing and Data Mining methods that have become highly relevant and applicable in almost every facet of human life: academic world, solving business problems, technology, manufacturing, health sector, etc. Therefore. equipping our students with a course like this will make the students potential graduates ready to solve problems in both academia and the industry which is in accordance with the Covenant University’s vision of Raising a New Generation of Leaders. The programme is further spiced with such Covenant University courses as Entrepreneurial Development Studies (EDS), Total Man Concept (TMC) and Leadership Development (DLD) which together would enhance the productive capacity of the Computer Science graduates and thus assists them to be very relevant in the production processes in addressing real life management problems in different domains like Business, Medical, Educational, Agriculture, etc. In essence, we endeavour to produce job creators’ not just potential employees. The graduates would also be simultaneously prepared for postgraduate scholastic research studies in Computer Science and allied disciplines.

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**Overview**

Data Management II has itsroots in Data warehousing and Data Mining. This course will expose the student to fundamental of data warehousing, how to build a data warehouse and how to discover hidden patterns from the data warehouse. for and the goal of learning the course is to understand the art of building computational methods with the ability to learn from experience through data. It is a very prominent sub-field of artificial intelligence with three distinct approaches to solving tasks: supervised learning. unsupervised learning and reinforcement learning. In this course. deeper concepts like ensemble models. multi-class classification and special types of neural network models are discussed. Ultimately. the goal is to empower students to be ready to tackle various real-world problems that require deeper knowledge of machine learning. both in terms of application and implementation.

The goal of this course is to empower students to be ready to tackle various real-world problems that require historical data and knowledge discovery for adequate inferencing.

**Objectives**

The objectives of the course are to:

1. describe principles and practice of data management;
2. describe NoSQL database systems as an extension of SQL database systems;
3. describe data warehousing;
4. describe the principles of data mining and the data mining techniques; and
5. describe how to apply data mining techniques for knowledge discovery with a case study dataset.

**Learning Outcomes**

At the end of this course. students should be able to:

1. explain the principles and best practices of managing data with efficiency and effectiveness;
2. demonstrate knowledge of SQL and NoSQL;
3. explain data warehouse concepts: Methodologies, tools and how to create a data warehouse;
4. explain data mining architecture and applications; and
5. apply data mining techniques in a project.

**Course Contents**

Rational databases: Mapping conceptual schema to relational schema. Database query languages (SQL) and NoSQL. Concept of functional dependencies and multi-valued dependencies. Transaction processing. Distributed databases. XML and semantic Web. Data warehousing. Introduction to data science. Introduction to data warehouse. OLTP systems. Differences between OLTP systems and data warehouse. Characteristics of data warehouse. Functionality of data warehouse. Advantages and applications of data warehouse. Advantages and applications. Top-down and bottom-up development methodology. Tools for data warehouse development. Data warehouse types. Introduction to data mining. Scope of data mining. How data mining works. Predictive modelling. Data mining and data warehousing. Architecture for data mining. Profitable applications. Data mining tools.

**Lab Work:** Practical exercises on basic R commands and data structures for manipulating data; how to read data from multiple formats in and out of R. using loops. conditional statements. and functions to automate common data management tasks. Exercises on how to clean and manage multiple complex datasets. manipulate textual data. basic web scraping techniques. for both standard web pages and the Twitter API. Work on techniques and hardware necessary to manage large datasets efficiently. Practical exercise on managing multiple data sets by example; working with text data; converting long- and wide-format data; and dealing with messy data. R programming fundamentals for data I/O and packages. looping and conditional statements. and functions.

**Minimum Academic Standards**

Smartboard equipped with software for adequate lecture delivery.