8.6 Digital filter: Implementation of digital filter, Applications of FFT algorithms.   (AExE0806)

9. Wireless and Telecommunication System (AExE09)

9.1 Telecommunication and its evolution: History of telecommunication. Generations and future trends. Telecommunication transmission media.   (AExE0901)

9.2 Cellular network: Free space propagation model, Reflection, diffraction and scattering; small scale multipath propagation and fading model, Rayleigh fading model, cellular concept frequency reuse Strategies Channel assignment and handover process, coverage and capacity in cellular system, cell splitting and cell sectoring concept.   (AExE0902)

9.3 Signal and system: Equalization and diversity techniques, Spread Spectrum modulation, Multiple Access techniques.   (AExE0903)

9.4 Switching systems: Digital and analog switching, soft switching, Routing and Signaling.
          (AExE0904)

9.5 Traffic engineering: Tele traffic parameters (busy hour, grade of service, service levels, and traffic intensity). Traffic routing in wireless networks, common channel signaling, integrated services digital networks. Packet vs circuit switching for PCN, protocol for network access.   (AExE0905)

9.6 Rules and regulations: International Telecommunication Union (ITU), Nepal Telecommunication Authority (NTA), Ministry of Communication and Information, National frequency allocation plan, Radio act.   (AExE0906)

10. Project Planning, Design and Implementation (AALL10)

10.1 Engineering drawings and its concepts: Fundamentals of standard drawing sheets, dimensions, scale, line diagram, orthographic projection, isometric projection/view, pictorial views, and sectional drawing.   (AALL1001)

10.2 Engineering Economics: understanding of project cash flow; discount rate, interest and time value of money; basic methodologies for engineering economics analysis (Discounted Payback Period, NPV, IRR & MARR); comparison of alternatives, depreciation system and taxation system in Nepal. (AALL1002)

10.3 Project planning and scheduling: project classifications; project life cycle phases; project planning process; project scheduling (bar chart, CPM, PERT); resources levelling and smoothing; monitoring/evaluation/controlling.   (AALL1003)

10.4 Project management: Information system; project risk analysis and management; project financing, tender and its process, and contract management.   (AALL1004)

10.5 Engineering professional practice: Environment and society; professional ethics; regulatory environment; contemporary issues/problems in engineering; occupational health and safety; roles/responsibilities of Nepal Engineers Association (NEA).   (AALL1005)

10.6 Engineering Regulatory Body: Nepal Engineering Council (Acts & Regulations).   (AALL1006)

3. Programming Language and Its Applications   **(ACtE03)**

3.1 Introduction to C programming: C Tokens, Operators, Formatted/Unformatted Input/output, Control Statements, Looping, User-defined functions, Recursive functions, Array (1-D, 2-D, Multi-dimensional), and String manipulations.   (ACtE0301)

3.2 Pointers, structure and data files in C programming: Pointer Arithmetic, Pointer and array, passing pointer to function, Structure vs Union, array of structure, passing structure to function, structure and pointer, Input/output operations on files, and Sequential and Random Access to File. (ACtE0302)

3.3 C++ language constructs with objects and classes: Namespace, Function Overloading, Inline functions, Default Argument, Pass/Return by reference, introduction to Class and object, Access Specifiers, Objects and the Member Access, Defining Member Function, Constructor and its type, and Destructor, Dynamic memory allocation for objects and object array, this Pointer, static Data Member and static Function, Constant Member Functions and Constant Objects, Friend Function and Friend Classes.

                                                 (ACtE0303)

3.4 Features of object-oriented programming: Operator overloading (unary, binary), data conversion, Inheritance (single, multiple, multilevel, hybrid, multipath), constructor/destructor in single/multilevel inheritances.   (ACtE0304)

3.5 Pure virtual function and file handling: Virtual function, dynamic binding, defining opening and closing a file, Input / Output operations on files, Error handling during input/output operations, Stream Class Hierarchy for Console Input /Output, Unformatted Input /Output Formatted Input /Output with ios Member functions and Flags, Formatting with Manipulators.   (ACtE0305)

3.6 Generic programming and exception handling: Function Template, Overloading Function Template, Class Template, Function Definition of Class Template, Standard Template Library (Containers, Algorithms, Iterators), Exception Handling Constructs (try, catch, throw), Multiple Exception Handling, Rethrowing Exception, Catching All Exceptions, Exception with Arguments, Exceptions Specification for Function, Handling Uncaught and Unexpected Exceptions. (ACtE0306)

4. Computer Organization and Embedded System   **(ACtE04)**

4.1 Control and central processing units: Control Memory, addressing sequencing, Computer configuration, Microinstruction Format, Design of control unit, CPU Structure and Function, Arithmetic and logic Unit, Instruction formats, addressing modes, Data transfer and manipulation, RISC and CISC Pipelining parallel processing.   (ACtE0401)

4.2 Computer arithmetic and memory system: Arithmetic and Logical operation, The Memory Hierarchy, Internal and External memory, Cache memory principles, Elements of Cache design - Cache size, Mapping function, Replacement algorithm, write policy, Number of caches, Memory Write Ability and Storage Permanence, Composing Memory.   (ACtE0402)

4.3 Input-Output organization and multiprocessor: Peripheral devices, I/O modules Input-output interface, Modes of transfer Direct Memory access, Characteristics of multiprocessors, Interconnection Structure, Inter-processor Communication and synchronization.   (ACtE0403)

4.4 Hardware-Software design issues on embedded system: Embedded Systems overview, Classification of Embedded Systems. Custom Single-Purpose Processor Design, Optimizing Custom Single-Purpose Processors, Basic Architecture, Operation and Programmer's View, Development Environment. Application-Specific Instruction-Set Processors.   (ACtE0404)

4.5 Real-Time operating and control system: Operating System Basics, Task, Process, and Threads, Multiprocessing and Multitasking, Task Scheduling, Task Synchronization, Device Drivers, Open-loop and Close-Loop control System overview, Control.   (ACtE0405)

4.6 Hardware descripts language and IC technology: VHDL Overview, Overflow and data

Nepal Engineering Council Registration Examination
Electronics and Communication Engineering
Electronics and Telecommunication Engineering
Information Technology and Telecommunication Engineering
(Code: AExE)

Chapters 1-4 are fundamentals/principles of concepts in Electronics and Communication engineering and Information Technology; chapters 5-9 are related to application of engineering principles in practice; and the last (10th) chapter is related to project planning, design and implementation.

1. Concept of Basic Electrical and Electronics Engineering **(AExE01)**

1.1 Basic concept: Ohm´s law, electric voltage current, power and energy, conducting and insulating materials. Series and parallel electric circuits, start-delta and delta-star conversion, Kirchhoff's law, linear and non-linear circuit, bilateral and unilateral circuits, active and passive circuits.   (AExE0101)

1.2 Network theorems: concept of superposition theorem, Thevenin`s theorem, Norton`s theorem, maximum power transfer theorem. R-L, R-C, R-L-C circuits, resonance in AC series and parallel circuit, active and reactive power.   (AExE0102)

1.3 Alternating current fundamentals: Principle of generation of alternating voltages and currents and their equations and waveforms, average, peak and rms values, three phase system.   (AExE0103)

1.4 Semiconductor devices: Semiconductor diode and its characteristics, BJT Configuration and biasing, small and large signal model, working principle and application of MOSFET and CMOS. (AExE0104)

1.5 Signal generator: Basic Principles of   Oscillator, RC, LC and Crystal Oscillators Circuits. Waveform generators.   (AExE0105)

1.6 Amplifiers: Classification of Output Stages, Class A Output Stage, Class B Output Stage, Class AB Output Stage, Biasing the Class AB Stage, Power BJTs, Transformer-Coupled Push-Pull Stages, and Tuned Amplifiers, op-amps.   (AExE0106)

2. Digital Logic and Microprocessor **(AExE02)**

2.1 Digital logic: Number Systems, Logic Levels, Logic Gates, Boolean algebra, Sum-of-Products Method, Product-of-Sums Method, Truth Table to Karnaugh Map.   (AExE0201)

2.2 Combinational and arithmetic circuits: Multiplexetures, Demultiplexetures, Decoder, Encoder, Binary Addition, Binary Subtraction, operation on Unsigned and Signed Binary Numbers. (AExE0202)

2.3 Sequential logic circuit: RS Flip-Flops, Gated Flip-Flops, Edge Triggered Flip-Flops, Mater- Slave Flip-Flops. Types of Registers, Applications of Shift Registers, Asynchronous Counters, Synchronous Counters.   (AExE0203)

2.4 Microprocessor: Internal Architecture and Features of microprocessor, Assembly Language Programming.   (AExE0204)

2.5 Microprocessor system: Memory Device Classification and Hierarchy, Interfacing I/O and Memory Parallel Interface. Introduction to Programmable Peripheral Interface (PPI), Serial Interface, Synchronous and Asynchronous Transmission, Serial Interface Standards. Introduction to Direct Memory Access (DMA) and DMA Controllers.   (AExE0205)

2.6 Interrupt operations: Interrupt, Interrupt Service Routine, and Interrupt Processing. (AExE0206)
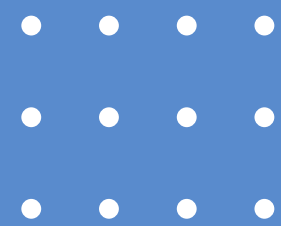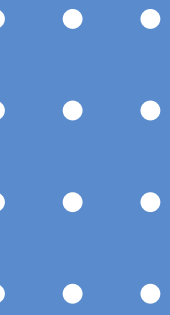
MACHINE LEARNING
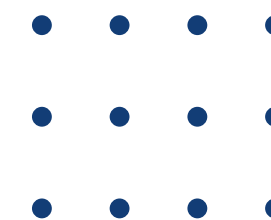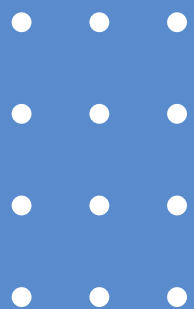
ABOUT US

CODSOFT is a vibrant and diverse community that brings together individuals with similar objectives and ultimate goals. Our main focus is on creating opportunities that span various areas, including leadership development, learning, student engagement, and fostering shared interests.

We believe in the power of leadership and its ability to drive positive change. That's why we provide platforms and resources for our community members to develop their leadership skills. Through mentorship programs, workshops, and collaborative projects, we empower individuals to take on leadership roles and make a difference in their respective fields.

INSTRUCTIONS

- Update your LinkedIn profiles

- For the machine learning internship, you will need to complete **at least 3 tasks** for successful completion of the internship.

- Maintain a separate GitHub repository(name as **CODSOFT** for all the tasks and share the link of the GitHub repo in the task submission form(it will be given later through email).

- You can refer to online resources such as Google Search and read tutorials. Watch videos(For Help).

SUBMISSION

- A **TASK SUBMISSION FORM** will be shared later through email. Till then please continue your task.

- A video need to be created to showcase your work, a demo of your effort.

- For the machine learning internship, you will need to complete **at least 3 tasks** for successful completion of the internship.

- The video can be hosted on LinkedIn for proof of your work and to build credibility among your peers. You can tag **@CODSOFT** in such posts.

- Please add **#codsoft** in each of your task video postings on LinkedIn, Additionally, you can also add hashtags such as #internship #webdevelopment. for more reach and visibility

ABOUT THE INTERNSHIP

COMPLETION
CERTIFICATE

PLACEMENT
SUPPORT
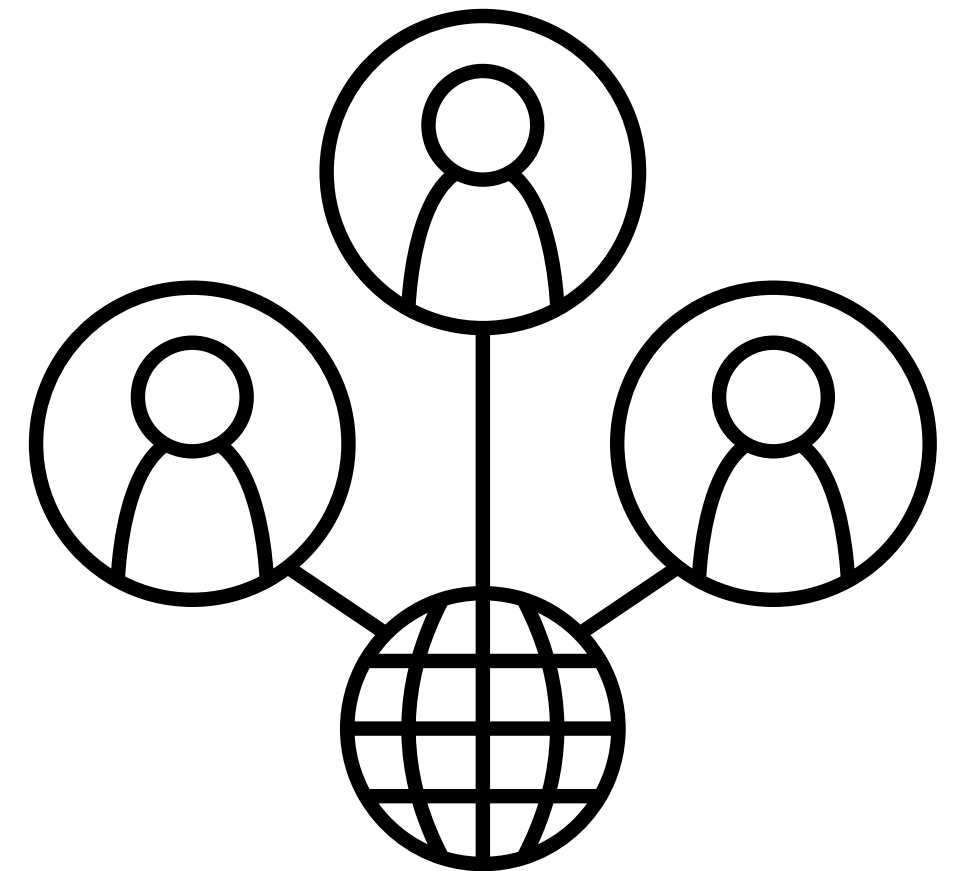
NETWORK
OPPORTUNITY
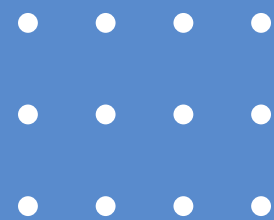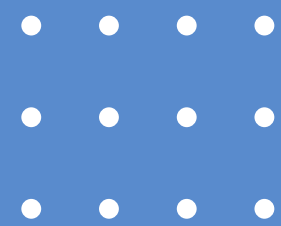
MACHINE LEARNING

CodSoft

For the machine learning internship, you will need to complete at least 3 tasks for successful completion of the internship.
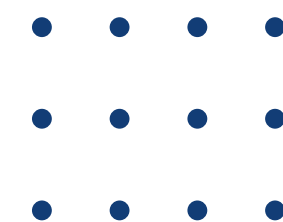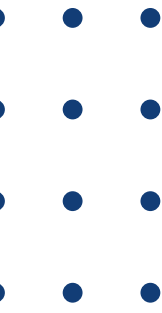
TASK 1

MOVIE GENRE CLASSIFICATION

Create a machine learning model that can predict the genre of a movie based on its plot summary or other textual information. You can use techniques like TF-IDF or word embeddings with classifiers such as Naive Bayes, Logistic Regression, or Support Vector Machines.
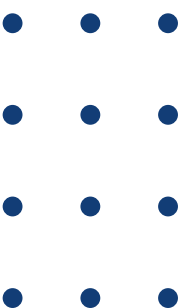
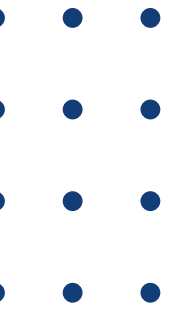DATASET   CLICK HERE

TASK 2

CREDIT CARD FRAUD DETECTION

Build a model to detect fraudulent credit card transactions. Use a dataset containing information about credit card transactions, and experiment with algorithms like Logistic Regression, Decision Trees, or Random Forests to classify transactions as fraudulent or legitimate.
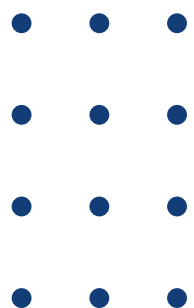
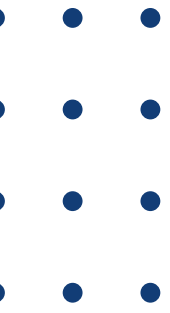DATASET   CLICK HERE

CUSTOMER CHURN PREDICTION

Develop a model to predict customer churn for a subscription-based service or business. Use historical customer data, including features like usage behavior and customer demographics, and try algorithms like Logistic Regression, Random Forests, or Gradient Boosting to predict churn.
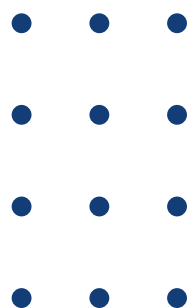
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TASK 4

SPAM SMS DETECTION

Build an AI model that can classify SMS messages as spam or legitimate. Use techniques like TF-IDF or word embeddings with classifiers like Naive Bayes, Logistic Regression, or Support Vector Machines to identify spam messages

DATASET   CLICK HERE

TASK 5

HANDWRITTEN TEXT GENERATION

Implement a character-level recurrent neural network (RNN) to generate handwritten-like text. Train the model on a dataset of handwritten text examples, and let it generate new text based on the learned patterns.

DATASET   CLICK HERE

DATASET   CLICK HERE

DATASET   CLICK HERE

(choose any one set)

TASK 1

MOVIE GENRE CLASSIFICATION

DATASET

CLICK HERE

TASK 2

CREDIT CARD FRAUD DETECTION

DATASET   CLICK HERE

TASK 3

CUSTOMER CHURN PREDICTION

DATASET   CLICK HERE

TASK 4

SPAM SMS DETECTION

DATASET   CLICK HERE

TASK 5

HANDWRITTEN TEXT GENERATION

DATASET   CLICK HERE

ASK US FOR HELP!

- THE PURPOSE OF THIS INTERNSHIP IS TO LEARN AND GROW.

- *We have no desire to dictate to you. It is entirely up to you whether you seek guidance or not.*

- The given tasks may seem very easy or very difficult. We expect you to approach the tasks with professional diligence and give them the attention they deserve."

GET SOCIAL WITH US

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✉ contact@codsoft.in

in CodSoft