Institute of Computer Science/Information Technology (ICS&IT)
Faculty of Management Sciences & CS/IT (FMCS)
The University of Agricultural Peshawar

Program:	BS(CS)-VI
Course Name:	Artificial Intelligence
Course Code:	CSC-511
Credit Hours:	03
Course Week:	16
Total Credit Hours:	48

Course Objectives:

In this age of rapid technological development, the importance of artificial intelligence cannot be underestimated. To bring more advancement in this field, a lot of work is needed to be done. The main objective of this course is to acquaint students with the basic knowledge of artificial intelligence that is, the concept, purpose and implementation. The course gives an overview of different areas like Expert Systems and robotics. The course also encompasses Machine Translation and Natural Language Processing in details.

Week-1

- Introduction to A.I.
- Scope
- Natural intelligence vs. artificial intelligence
- AI computing vs. traditional computing

Week-2

Application areas of AI

- Expert systems
- Natural Language Processing (NLP)
- Computer vision
- Speech recognition and generation
- Robotics
- Neural network
- Virtual reality

Week-3

- Expert system
- Evolution of expert system
- Structure of expert system
- Types of expert system
- Main application areas of expert system

Week-4

- Features of expert system
- Overview of expert system's programming tools
- Orientation to some typical/existing expert systems
- Benefits and limitations of Experts systems

Week-5

- Robotics:
- Emergence
- Reasons to use a robot
- Main application areas
- Laws of robotics

Week-6

- Types of robots
- Components of a typical robot
- Characteristics of robotics
- Robot sensors
- Robots programming tools

Week-7

- Natural Language Processing(N LP)
- Natural languages vs. computer languages
- Natural language understanding (NLU)
- Natural language generation (NLG)
- Domain areas of NLP
- Programming tools for NLP

Week-8

- Branches of NLP-Question Answering, Machine Translation
- Overview of ELIZA
- Problems in Natural Languages
- Ambiguity:
  - Lexical
  - Syntactic
  - Discourse
  - Transient
- Imprecision
- Inaccuracy
- Incompleteness
- Solution of the NL problems

- NLU techniques
  - Syntactic analysis
  - Semantics
  - Morphology
  - Pragmatics

Week-9

- Machine Translation (MT)
- History of MT
- Need of MT
- Types of MT
  - Bilingual & multilingual MT
- Categories of MT
- Advantages of MT

Week-10

- Causes of failure of MT
- Problems with MT
- Translation steps
  - Analysis
  - Transfer
  - Generation

Week-11

- Strategies for machine translation
  - Direct translation
  - Transfer
  - Interlingua
- Orientation of some existing/famous MT systems

Week-12

- Dictionaries & their need
- Types of Dictionaries
  - Monolingual dictionary
  - Bilingual dictionary
  - Multilingual dictionary
- Design of Multi & bilingual dictionaries

Week-13

- Units of translation
- Sentence based MT (SBMT) and their problems
- Knowledge based MT (KBMT) and their problems
- Discourse based MT
- Discourse unit
- Types of discourses and their dissection

Week-14

- The need of pronouns
- Noun, pronoun, verb,
- Exophora, Endophora-Anaphora, Cataphora
- Categories of Anaphora
- Verb phrase & noun phrase Anaphora
- Anaphoric devices & its categories
- Uses of pronouns and their problems

Week-15

- Cohesion
- Coherence
- Ellipses, elliptical sentences resolution
- Suggestions for MT applications
- Machine learning:
- A paradigm for learning
- Classification of learning strategies
  - Rote learning
  - Learning by analogy
  - Learning by instruction
  - Learning by induction
  - Learning by deduction

Week-16

- Project

Total Marks: 100

Recommended Books:

1. UNDERSTANDING AI by Mishkoff
2. CRASH COURSE IN ARTIFICIAL INTELLIGENCE & EXPERT SYSTEM by Louis E. Frenzd
3. TEXT BASED MACHINE TRANSLATION by Dr.M. Abid.