

UHU006: INTRODUCTORY COURSE IN FRENCH

L T P Cr

3 0 0 3.0

Course objectives

The objective of the course is to introduce to the students:

- The basics of French language to the students. It assumes that the students have minimal or no prior knowledge of the language.
- To help them acquire skills in writing and speaking in French, comprehending written and spoken French.
- The students are trained in order to introduce themselves and others, to carry out short conversation, to ask for simple information, to understand and write short and simple messages, to interact in a basic way.
- The main focus of the students will be on real life language use, integration of French and francophone culture, & basic phrases aimed at the satisfaction of needs of concrete type.
- During class time the students are expected to engage in group & pair work.

Course Contents

Communicative skills

Greetings and Its Usage, Asking for and giving personal information, How to ask and answer questions, How to talk over the phone, Exchange simple information on preference, feelings etc. Invite, accept, or refuse invitation, Fix an appointment, Describe the weather, Ask for/give explanations, Describe a person, an object, an event, a place.

Grammar

Pronouns: Pronom sujets (Je/ Tu/Il/Elle/Nous/Vous/Ils/Elles), Nouns: Genders, Articles: Definite article and Indefinite articles, Verbs: Regular verbs (-er, -ir ending) Irregular verbs (-re ending) Auxiliary verbs (avoir, être, aller). Adjective: Description, Adjective possessive, Simple Negation, Tense: Present, Future, Questions, Singular & plural.

Vocabulary

Countries and Nationalities, Professions, Numbers (ordinal, cardinal), Colours, Food & drinks, Days of the week, Months, Family, Places.

Phonetics

The course develops the ability:

To pronounce words, say sentences, questions & give orders using the right accent and intonation. To express surprise, doubt, fear, and all positive or negative feelings using the right intonation. To distinguish voiced and unvoiced consonants. To distinguish between vowel sounds.

COURSE OUTCOMES

Upon the completion of the course:

- The students begin to communicate in simple everyday situations acquiring basic grammatical structure and vocabulary.
- The course develops oral and reading comprehension skills as well as speaking and writing.
- Students can demonstrate understanding of simple information in a variety of authentic materials such as posters, advertisement, signs etc.
- Discuss different professions, courses and areas of specialisation.
- Write simple messages, letters, composition and dialogues. Complete simple forms and documents.
- Express feelings, preferences, wishes and opinions and display basic awareness of francophone studies.
- Units on pronunciation and spelling expose students to the different sounds in the French language and how they are transcribed.

Books Recommended:

1. *Alter ego-1* : Méthode de français by Annie Berthet, Catherine Hugot, Véronique M. Kizirion, Beatrix Sampsonis, Monique Waendendries, Editions Hachette français langue étrangère.
2. *Connexions-1* : Méthode de français by Régine Mérieux, Yves Loiseau, Editions Didier
3. *Version Originale-1*: Méthode de français by Monique Denyer, Agustin Garmendia, Marie-Laure Lions-Olivieri, Editions Maison des Langues, Paris 2009
4. *Latitudes-1* : Méthode de français by Régine Mérieux, Yves Loiseau, Editions Didier
5. *Campus-1* : Méthode de français by Jacky Girardet, Jacques Pécheur, Editions CLE International.
6. *Echo-1* : Méthode de français by J. Girardet, J. Pécheur, Editions CLE International.

UCS001: Introduction to Cyber Security

LTP 3 0 0

Threat landscape: terminology, cyber security threats, keeping up to date, Authentication: access control, passwords, two-factor authentication, Malware: types of malware, attack vectors, preventing infection, Networking and communications: fundamentals, security challenges, standards, Cryptography: symmetric and asymmetric cryptography, applications, Network security: firewalls, virtual private networks, intrusion detection / prevention, When your defences fail: cyber security laws, recovering from attacks, Managing security risks: risk analysis and management

By end of the course student will be able to

CLO 1: Explain basic cyber security terminology; have skills for keeping up to date on cyber security issues; and be able to identify information assets.

CLO 2: Describe basic authentication mechanisms; have skills to improve their password security; and be aware of alternative authentication methods.

CLO 3: Identify main malware types; awareness of different malware propagation methods; and skills for preventing malware infections.

CLO 4: Explain basic networking concepts; be aware of network security challenges; and have knowledge of key networking standards.

CLO 5: Describe cryptography terminology; be able to use cryptography for email; be aware of applications of cryptography.

CLO 6: Demonstrate understanding of firewalls, virtual private networks and network intrusion detection and prevention technologies.

CLO 7: Describe legal and regulatory issues relating to cyber security; and understand how to recover from security failures.

CLO 8: Apply basic risk analysis and management techniques.

UHU007: EMPLOYABILITY DEVELOPMENT SKILLS (EDS)

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Course Objective

This course aims to sensitize students with the gamut of skills which facilitate them to enhance their employability quotient and do well in the professional space. These skills are imperative for students to establish a stronger connect with the environment in which they operate. An understanding of these skills will enable students to manage the placement challenges more effectively.

Course Content

Emotional Intelligence: Understanding Emotional Intelligence (EI); Daniel Goleman’s EI Model: Self Awareness, Self-Regulation, Internal Motivation, Empathy, Social Skills; Application of EI during Group Discussions & Personal Interview; Application of EI in personal life, student life and at the workplace

Team Dynamics & Leadership: Understanding the challenges of working within a team format in today’s complex organizational environments; Stages of team formation; Appreciating forces that influence the direction of a team's behaviour and performance; Cross-functional teams; Conflict in Teams- leveraging differences to create opportunity Leadership in the team setting & energizing team efforts; Situational leadership; Application of team dynamics & collaboration in Group Discussions; Application of team dynamics at the workplace

Complex Problem Solving: Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions; Understanding a working model for complex problem solving - framing the problem, diagnosing the problem, identifying solutions & executing the solutions; Appreciation of complex problem solving at the workplace through case studies

Lateral Thinking: Understanding lateral thinking & appreciating the difference between vertical & lateral thinking, and between convergent & divergent thinking; Understanding brain storming & mind-maps; Solving of problems by an indirect and creative approach, typically through viewing the problem in a new and

unusual light; Application of lateral thinking during Group Discussions & Personal Interviews; Application of lateral thinking in college projects and at the workplace

Quantitative Reasoning: Thinking critically and applying basic mathematics skills to interpret data, draw conclusions, and solve problems; Developing proficiency in numerical reasoning; Application of quantitative reasoning in aptitude tests

Verbal Reasoning: Understanding and reasoning using concepts framed in words; Critical verbal reasoning; Reading Comprehension; Application of verbal reasoning in aptitude tests

Reference Books

1. Emotional Intelligence, Daniel Goleman (Bantam Books)
2. Creating Teams with an Edge, Harvard Business Essential (Harvard Business Review Press)
3. Influence- The Psychology of Persuasion, Robert B. Cialdini (Collins Business)
4. The thinker's toolkit: 14 powerful techniques for problem solving, Jones M. D. (Random House Digital, Inc.)
5. Six Thinking Hats, Edward de Bono (Little, Brown and Company)
6. Group Dynamics for Teams, Daniel J Levi
7. Building Better Teams (Harvard Business Review)
8. Teamwork 101: What every Leader needs to know, John Maxwell
9. A Technique for Producing Ideas, James Webb Young
10. The Art of Innovation, Jonathan Littman
11. Serious Creativity, Edward De Bono
12. Lateral Thinking, Edward De Bono
13. The Myths of Creativity, David Burkus
14. Mind Maps, Tony Buzan
15. Social Intelligence, Daniel Goleman
16. Emotional Intelligence- HBR's 10 best reads
17. Presentation skills for students, Joan Emden, Lucinda Becker
18. The Handbook of Emotional Intelligence- The theory and practise of Development, Evaluation, Education and Application- at Home, School and in the Workplace, Reuver Bar

GENERIC ELECTIVE

19. Crucial Conversations: Tool for talking when stakes are high, Al Switzler, Joseph, Grenny, Ron Me Milan
20. Never Eat Alone, Keith Ferrazzi
21. The Back of Napkin, Dan Roam
22. The Logical Thinking process, William Dettmer
23. An expert guide to problem solving: with practical examples, Aditi Agarwal
24. The Great Book of Puzzles & Teasers, George J Summers
25. Quantitative Aptitude, R.S. Aggarwal
26. Magical Book on Quicker Maths, M. Tyra
27. Magical Book Series: Data Interpretation, K. Kundan
28. A Modern Approach to Verbal Reasoning, R.S. Aggarwal

Online Support

Supporting e-lectures for all the above modules with value added articles and concept builders. Self-assessment tools provided to students for comprehensive gap analysis.

UEN004 – TECHNOLOGIES FOR SUSTAINABLE DEVELOPMENT

L	T	P	Cr
3	0	0	3.0

Course Objectives:

To provide acquaintance with modern cleaner production processes and emerging energy technologies; and to facilitate understanding the need and application of green and renewable technologies for sustainable development of the Industry/society

Course Contents:

Concepts of Sustainability and Industrial Processes: Industrialization and sustainable development; Cleaner production (CP) in achieving sustainability; Source reduction techniques - Raw material substitution; Process modification and equipment optimization; Product design or modification; Reuse and recycling strategies; Resources and by-product recovery from wastes; Treatment and disposal; CDM and Pollution prevention programs; Good housekeeping; CP audits.

Green Design: Green buildings - benefits and challenges; public policies and market-driven initiatives; Effective green specifications; Energy efficient design; Passive solar design; Green power; Green materials and Leadership in Energy and Environmental Design (LEED)

Renewable and Emerging Energy Technologies: Introduction to renewable energy technologies- Solar; wind; tidal; biomass; hydropower; geothermal energy technologies; Emerging concepts; Biomolecules and energy; Fuel cells; Fourth generation energy systems.

Course Learning Outcomes (CLOs):

The students will be able to:

- comprehend basic concepts in source reduction, waste treatment and management
- Identify and plan cleaner production flow charts/processes for specific industrial sectors
- examine and evaluate present and future advancements in emerging and renewable energy technologies

Recommended Books

1. Kirkwood RC and Longley, AJ (Eds.), *Clean Technology and the Environment*, Chapman & Hall, London (1995).
2. World Bank Group; *Pollution Prevention and Abatement Handbook – Towards Cleaner Production*, World Bank and UNEP; Washington DC (1998).
3. Modak P, Visvanathan C and Parasnis M, *Cleaner Production Audit, Course Material on Cleaner Production and Waste Minimization*; United Nations Industrial Development Organization (UNIDP) (1995).
4. Rao S and Parulekar BB, *Energy Technology: Non-conventional; Renewable and Conventional*; Khanna Pub.(2005) 3rd Ed.

UHU009: INTRODUCTION TO COGNITIVE SCIENCE

L T P Cr
3 0 0 3.0

Course Objectives

This course provides an introduction to the study of intelligence, mind and brain from an interdisciplinary perspective. It encompasses the contemporary views of how the mind works, the nature of reason, and how thought processes are reflected in the language we use. Central to the course is the modern computational theory of mind and it specifies the underlying mechanisms through which the brain processes language, thinks thoughts, and develops consciousness.

Course Contents

Overview of Cognitive Science: Newell's big question . Constituent disciplines. Interdisciplinary approach. Unity and diversity of cognitive science.

Philosophy: Philosophy of Mind. Cartesian dualism. Nativism vs. empiricism. Mind-body problem. Functionalism. Turing Test. Modularity of mind. Consciousness. Phineas Gage. Physicalism.

Psychology

Behaviorism vs. cognitive psychology. The cognitive revolution in psychology. . Hardware/software distinction . Perception and psychophysics. Visual cognition. Temporal dynamics of visual perception. Pattern recognition. David Marr's computational theory of vision. Learning and memory. Theories of learning. Multiple memory systems. Working Memory and Executive Control. Memory span. Dissociations of short- and long-term memory. Baddeley's working memory model.

Linguistics. Components of a grammar. Chomsky. Phrases and constituents. Productivity. Generative grammars. Compositional syntax. Productivity by recursion. Surface- and deep structures. Referential theory of meaning. Compositional semantics. Semantics. Language acquisition. Is language innate? Language and thought.

Neuroscience: Brain anatomy. Hierarchical functional organization. Decorticate animals. Neuroimaging. Neurophysiology. Neuron doctrine. Ion channels. Action potentials. Synaptic transmission. Synaptic plasticity. Biological basis of learning. Brain damage. Amnesia. Aphasia. Agnosia. Parallel Distributed Processing(PDP). Computational cognitive neuroscience. The appeal of the PDP approach. Biological Basis of Learning. Cajal's synaptic plasticity hypothesis. Long-term potentiation (LTP) and depotentiation (LTD). NMDA receptors and their role in LTP. Synaptic consolidation. Vertical integration. The Problem of representation. Shannon's information theory.

GENERIC ELECTIVE

Artificial Intelligence: Turing machines. Physical symbol systems. Symbols and Search .Connectionism. Machine Learning.. Weak versus strong AI. Subfields, applications, and recent trends in AI. Turing Test revisited. SHRDLU. Heuristic search. General Problem Solver (GPS). Means-ends analysis

Cognitive architectures: Tripartite architecture. Integration. ACT-R Architecture Modularity.

Text Books

José Luis Bermúdez (2014). Cognitive Science: An Introduction to the Science of the Mind (2nd Ed.). Cambridge, UK: Cambridge.

Friedenberg ,J.D. and Silverman,G.(2005). Cognitive Science: An introduction to the study of mind. Sage Publications:. London

Thagard,P. (2005). Mind: An introduction to Cognitive Science. MIT Press.

Reference Books

Thagard, P.(1998) Mind readings: introductory selections on cognitive science. MIT Press, Cambridge, Mass.

UHU008: INTRODUCTION TO CORPORATE FINANCE

L	T	P	Cr
3	0	0	3

Course Objective:

This course aims to; provide the students with the fundamental concepts, principles and approaches of corporate finance, enable the students to apply relevant principles and approaches in solving problems of corporate finance and help the students improve their overall capacities.

Course Content:

Introduction to corporate finance: Finance and corporate finance. Forms of business organizations, basic types of financial management decisions, the goal of financial management, the agency problem; The role of the financial manager; basic types of financial management decisions.

Financial statements analysis :Balance sheet, income statement, cash flow, fund flow financial statement analysis Computing and interpreting financial ratios; conducting trend analysis and Du Pont analysis.

The time value of money: Time value of money, future value and compounding, present value and discounting, uneven cash flow and annuity, discounted cash flow valuation.

Risk and return: Introduction to systematic and unsystematic risks, computation of risk and return, security market line, capital asset pricing model.

Long-term financial planning & Financial Decisions:Various sources of long term financing, the elements and role of financial planning, financial planning model, percentage of sales approach, external financing needed. Cost of capital, financial leverage, operating leverage. Capital structure, theories of capital structure net income , net operating income & M&M proposition I and II.

Short-term financial planning and management:Working capital, operating cycle, cash cycle, cash budget, short-term financial policy, cash management, inventory management, credit management.

Capital budgeting : Concepts and procedures of capital budgeting, investment criteria (net present value, payback, discounted payback, average accounting return, internal rate of return, profitability index), incremental cash flows, scenario analysis, sensitivity analysis, break-even analysis,

Dividend policy: Dividend, dividend policy, Various models of dividend policy (Residual approach, Walter model, Gordon Model, M&M, Determinants of dividend policy.

Security valuation: Bond features, bond valuation, bond yields, bond risks, stock features, common stock valuation, and dividend discount & dividend growth models. Common stock yields, preferred stock valuation.

Textbooks

1. Principles of Corporate Finance, 9th edition, Brealey, Myers & Allen, The McGraw-Hill
2. Companies, Inc., 2007. Financial Management: Theory and Practice, Brigham & Ehrhardt, 10th edition, Cengage
3. Learning, 2002. Fundamentals of Financial Management, 12th edition, Horne & Wachowicz, Pearson Education, Inc., 2005.

Reference Books

1. Van Horne, James, C (2002). Principles of Financial Management, Pearson
2. Brigham. Eugene F. and Houston. Joel F. (2006). Fundamentals of Financial Management, 10th Edition, Cengage Learning
3. Pandey, I. M., Financial management, Vikas Publishing House Pvt. Ltd., Noida, 2011, 12th ed.
4. Elton, Edwin J. and M.J.Gruber(2007), 'Modern Portfolio Theory and Investment Analysis', 7th Edition, John Wiley and Sons.

UPH063: Nanoscience & Nanomaterials

L	T	P	Cr
3	0	0	3.0

Prerequisite(s): None

Course Objectives: To introduce the basic concept of Nanoscience and advanced applications of nanotechnology.

Fundamental of Nanoscience: Features of Nanosystem, Free electron theory and its features, Idea of band structures, Density of states in bands, Variation of density of state and band gap with size of crystal.

Quantum Size Effect: Concepts of quantum effects, Schrodinger time independent and time dependent equation, Electron confinement in one-dimensional well and three-dimensional infinite square well, Idea of quantum well structure, Quantum dots and quantum wires.

Nano Materials: Classification of Nano Materials their properties, Basic concept relevant to application, Fullerenes, Nanotubes and nano-wires, Thin films chemical sensors, Gas sensors, Vapour sensors and Bio sensors.

Synthesis and processing: Sol-gel process, Cluster beam evaporation, Ion beam deposition, Chemical bath deposition with capping techniques and ball milling, Cluster assembly and mechanical attrition, Sputtering method, Thermal evaporation, Laser method.

Characterization: Determination of particle size, XRD technique, Photo luminescence, Electron microscopy, Raman spectroscopy, STEM, AFM.

Applications: Photonic crystals, Smart materials, Fuel and solar cells, Opto-electronic devices.

Course outcomes: Students will be able to understand quantum size effect on the properties of materials at nanoscale and be able to design and characterize materials at nanoscale.

Text Books:

1. Booker, R., Boysen, E., *Nanotechnology*, Wiley India Pvt. Ltd. (2008).
2. Rogers, B., Pennathur, S., Adams, J., *Nanotechnology*, CRS Press (2007).
3. Bandyopadhyay, A.K., *Nano Materials*, New Age Int., (2007).

Reference Books:

1. Niemeyer, C. N., and Mirkin, C.A., *Nanobiotechnology Concepts, Applications and Perspectives*, Wiley VCH, Weinheim, Germany (2007).

UMA066: GRAPH THEORY AND APPLICATIONS

L T P Cr
3 0 0 3.0

Course Objectives: The objective of the course is to introduce students with the fundamental concepts in graph Theory, with a sense of some its modern applications. They will be able to use these methods in subsequent courses in the computer, electrical and other engineering,

Introduction: Graph, Finite and infinite graph, incidence and degree, Isolated vertex, Pendent vertex and null graph, Isomorphism, Sub graph, Walks, Paths and circuits, Euler circuit and path, Hamilton path and circuit, Euler formula, Homeomorphic graph, Bipartite graph, Edge connectivity, Computer representation of graph, Digraph.

Tree and Fundamental Circuits: Tree, Distance and center in a tree, Binary tree, Spanning tree, Finding all spanning tree of a graph, Minimum spanning tree.

Graph and Tree Algorithms: Shortest path algorithms, Shortest path between all pairs of vertices, Depth first search and breadth first of a graph, Huffman coding, Cuts set and cut vertices, Warshall's algorithm, topological sorting.

Planar and Dual Graph: Planar graph, Kuratowski's theorem, Representation of planar graph, five-color theorem, Geometric dual.

Coloring of Graphs: Chromatic number, Vertex coloring, Edge coloring, Chromatic partitioning, Chromatic polynomial, covering.

Application of Graphs and Trees: Konigsberg bridge problem, Utilities problem, Electrical network problem, Seating problem, Chinese postman problem, Shortest path problem, Job sequence problem, Travelling salesman problem, Ranking the participant in a tournament, Graph in switching and coding theory, Time table and exam scheduling, Applications of tree and graph in computer science.

Course learning outcomes: Upon completion of the course, the students will be able to:

- 1) understand the basic concepts of graphs, directed graphs, and weighted graphs and able to present a graph by matrices.
- 2) understand the properties of trees and able to find a minimal spanning tree for a given weighted graph.
- 3) understand Eulerian and Hamiltonian graphs.
- 4) apply shortest path algorithm to solve Chinese Postman Problem .
- 5) apply the knowledge of graphs to solve the real life problem.

Text Books:

- 1) Narsingh, Deo, Graph Theory with Application to Engineering with Computer Science, PHI (2007).
- 2) West, D. B., Introduction to Graph Theory, Pearson Education (2008)

Reference Books:

- 1) Bondy, J. A. and Murty, U.,S.,R., Graph Theory with Applications, North Holland Publication (2000).
- 2) Rosen, K. H., Discrete Mathematics and its Applications, Tata McGraw Hill (2007).