SL.NO.1

Indian Knowledge System and its applications
Semester-2
Total Credits: 2

Module-I: *Introduction to Indian Knowledge System*

Lecture Hours: 08

This module shall cover:

- What is Indian Knowledge System ?
- Why do we need it?
- Introduction to Vedas, Vedāṅgas , Kalpa, Jyotiṣa, Purāṇa, Itihāsas, and their relevance
- Basics of Pāṇini's grammar and Aṣṭādhyāyī (word generation, sentence formation, verbs and prefixes, suffixation etc.) and its extensive application on languages other languages
- Indian scheme of knowledge and classifications
- Indian framework for establishing valid knowledge and its applicability in today's society

Learning Outcomes:

- This module will provide learners with definition, relevance and overview of Indian Knowledge System.
- Learners will be introduced to Vedas, Vedangas , Puranas etc, and will be encouraged to explore their relevance today.
- Learners will also assess the applicability of Panini's grammatical framework to Indian and other languages.
- The module will appraise learners about Indian scheme of knowledge and examine the relevance of the framework for establishing valid knowledge in today's society.

Module-II: *Introduction to Ancient Indian Political and Economic System*

Lecture Hours:08

This module shall cover:

- Concept of Kingship: Duties and Responsibilities of a King
- Three Tier Political System- DharmaDand, RajDand, NyayDand
- Law and Administration, Suppression of Crime, Defense System and Foreign Policy
- Concept of Wealth and it'sownership, KautilyaSaptang: Seven Sources of Income
- Indian Economy - taxation, savings, expenditure

Learning Outcomes:

- This module will help learners gain understanding of nature & working of Ancient Political and Economic System.
- They will also learn how the Kings functioned in Ancient India, and about the pillars of Kingship - Dharma Dand, Raj Dand&NyayDand.
- The module will also give them an overview of Ancient Indian Administration, Ancient Defense System, and Foreign Policy.
- Learners will get an overview of Kautilya's Economic System covering sources of Income, taxation policy, creation of wealth & distribution.

Module-III: *Introduction to Ancient Indian Art and Architecture*

Lecture Hours: 08

This module shall cover:

- Origin & Concept of Ancient Indian Art and Architecture
- Introduction to Temple Architecture
- Styles of Architecture
- Introduction to Cave & Monolithic Architecture
- Introduction to Various Architecture Models like Chalukya, Pallava, Chola, Hoysala, Mauryan,Vijaynagaretc.
- Knowledge of Buddhist and Jain Art & Architecture

Learning Outcomes:

- This module will familiarise learners with ancient Indian art and architecture.
- Learners will also learn about Ashtanga architecture, the idea of building architecture through different dimensions.
- They will study the concepts of direction, planets, constellations, Vastu, the selection of stones, their transportation and the method of direct construction.
- The module will also give them an overview of different types, and model of Architecture.
- Learners will get an overview of Buddhist and Jain Art & Architecture.

Module-IV: *Introduction to Ancient Indian Mathematics, Astronomy, and approach to Health*

Lecture Hours: 06

This module shall cover:

- Salient features of Ancient Indian Mathematics
- Contributions of Indian Mathematicians to Algebra, Geometry, Trigonometry, Binary mathematics
- Overview of Indian astronomy
- The celestial coordinate system, and the Indian calendar system
- Astronomical Instruments (Yantras) – Application of Physics & Chemistry
- Āyurvedic approach to health, food intake methods, disease management elements & wellness – application of Botany and Medical Science.

Learning Outcomes:

- This module will appraise learners about salient features of Ancient Indian Mathematics and contributions of Indian Mathematicians to Indian knowledge and their applicability today.
- Learners will also learn about Indian astronomy, astronomical instruments (Yantras)
- The module will also familiarise learners with ayurvedic approach to health, life style management& wellness.

References:

Acarya, P.K. (1996). Indian Architecture, Munshiram Manoharlal Publishers, New Delhi.

Bag, A.K. (1979). Mathematics in Ancient and Medieval India, Chaukhamba Orientalia, New Delhi.

Banerjea, P. (1916). Public Administration in Ancient India, Macmillan, London.

Chatterjee. Satishchandra. (2012). An Introduction to Indian Philosophy, Rupa & Co, Calcutta.

Kapoor Kapil, Singh Avadhesh (2021). "Indian Knowledge Systems Vol – I & II", D.K. Print World Ltd, New Delhi.

Mahadevan, B., Bhat Vinayak Rajat, Nagendra Pavana R.N. (2022), "Introduction to Indian Knowledge System: Concepts and Applications", PHI Learning Private Ltd. Delhi.

Singh, Bal Ram. (2011) Indian Family System: The Concept, Practices and Current Relevance, D.K. Print World Ltd, New Delhi.

Subbarayappa, B.V. and Sarma, K.V. (1985). Indian Astronomy: A Source Book, Nehru Centre, Mumbai.

Sl. No. 2

Hands on Machine Learning

Unit 1: Supervised learning and Unsupervised learning, Linear Regression, Cost and Loss, Gradient descent, Multiple features, Feature scaling and engineering, train test split, Checking convergence, Polynomial regression, implementation in Python. Measuring performance using MSE, RMSE, R2, Adjusted R2. 2+2+1

Unit 2: Logistic Regression, decision boundary, cost and loss, Gradient descent, addressing overfitting/underfitting, Regularization (L1 & L2), implementation in Python. Measuring performance using Percision, Recall, F1 score, ROC-AUC, KS. 2+2+1

Unit 3: Neural network for classification problem, forward/backward propagation, cross validation, multiclass classification, bias and variance, error analysis, coding in Python, problem of digit recognition. 2+2+2

Unit 4: Decision tree for classification and regression, Entropy, Gini, gain. Ensemble techniques: Bagging and boosting. Random forest and XG boost. 2+2+2

Unit 5: Project implementation (open source data collection, problem definition, data cleaning, performance metrics and model building.) 8

Prerequisite: Python basic

Reference Books:

1. Hands on Machine Learning with Sci-Kit learn, Keras & Tensor flow – Aurelion Geron ; Pub: O'Reilly

2. Python Data Science Handbook – Jake VanderPlas ; Pub: O'Reilly

SL.NO.5

Common Value added Course (CVAC) on: "Lifestyle Diseases and Their Prevention"

Course Title: **'Lifestyle Diseases and Their Prevention'**

Course Duration: **One Semester**
Full Marks: **50 (2credits)**
Course Description: This course explores the impact of lifestyle choices on health and the prevention of lifestyle-related diseases. Students will examine the factors contributing to diseases such as obesity, diabetes, heart disease, stress-related disorders etc and simple remedy and therapeutic measures through lectures, practical activities, and case studies. Students will also learn about effective strategies for prevention and health promotion.
This course aims to explore the physiological effects of yoga, meditation, and music on the human body and mind. Students will learn about the scientific principles behind these practices and their impact on overall well-being.

Learning Outcomes: By the end of this course, students should be able to :
1. Define lifestyle diseases and distinguish them from other health conditions.
2. Identify common lifestyle-related diseases, their risk factors, and prevalence.
3. Analyze the impact of nutrition, physical activity, sleep, and stress management on health.
4. Evaluate the role of public health initiatives in promoting healthier lifestyles.
5. Create a personalized plan for improving their own lifestyle and preventing lifestyle Diseases.
6. Explain the physiological mechanisms underlying the benefits of yoga, meditation, and music.
7.. Demonstrate basic yoga postures and breathing techniques.
8.. Practice various meditation techniques for stress reduction and mental clarity.
9. Understand the role of music in relaxation and emotional regulation and research studies related to the physiological effects of these practices.
10. Apply these practices to enhance personal well-being.

Course Outline:
Introduction to Lifestyle Diseases: Definitions and classifications
Causes and consequences of obesity; Diabetes mellitus: types, risk factors, and management.
Cardiovascular Diseases: Heart disease and hypertension; Role of diet and exercise in heart Health.
Dietary guidelines; Meal planning for health.
Physical Activity and Exercise: Benefits of physical activity; Designing an exercise program.
Stress Management and Mental Health: Sources of stress and its impact; Stress reduction Techniques.Physiological benefits of yoga Pranayama and its impact on respiratory and cardiovascular systems
Breathing Techniques: Meditation and Mindfulness: Different meditation techniques; Effects of meditation as well as music in overall well being of human

Suggested Reading on CVAC Course on "Lifestyle Diseases and their Prevention"

1. The 4 Pillar Plan" by Dr. Rangan Chatterjee

2."How Not to Die" by Michael Greger, M.D., and Gene Stone

3. "The Miracle of Mindfulness" by Thich Nhat Hanh

4."The Healing Power of Sound" by Mitchell L. Gaynor, M.D.

5."The Inner Tradition of Yoga: A Guide to Yoga Philosophy for the Contemporary Practitioner" by Michael Stone

SL. NO. 6

2-Credit CVAC Course (For 2nd Semester)
Value-oriented Life-Skill Education
(Self Awareness, Relationship Building, Effective Communication, Change Management, Stress Management & Responsible Decision Making)

Course Objective:

This course aims to increase students' self-understanding to enhance their self-awareness and to expand their capacity of self-actualization through the grooming of value-oriented life skills. It facilitates their understanding of personal characteristics and of themselves in relation to the social systems they have been brought up in. It will also equip them with a positive mind set and a proper perspective to remove the commonly observed biases in relationships. Instead they are expected to adopt compassionate attitude to human actions. It will further help them in controlling, organizing and coordinating the activities of the mind in order to achieve their defined goals. It will help the students in appreciating different types of intelligence possessed by human mind and identify them, apply them. It will enhance their ability of critical thinking, focus, concentration and help them in making responsible decisions. Overall aim is to empower students with the knowledge, skills, and mindset necessary to lead a fulfilling and purposeful life, while making positive contributions to society.

Intended Learning Outcomes:

After successful completion of this course students are expected to

1. Develop self-awareness: The course intends to help individuals gain an understanding of themselves, their values, beliefs, strengths, and weaknesses. It encourages self-reflection and introspection to promote personal growth and self-improvement;
2. Promote personal growth and self-improvement: The course encourages individuals to set personal goals, explore their passions, and work towards self-improvement. It provides tools and techniques to develop a growth mindset, set meaningful goals, and manage time effectively;
3. Enhance interpersonal skills: The course focuses on improving individuals' interpersonal skills, such as effective communication, active listening, empathetic approaches and appreciation of interdependence. It aims to enhance their ability to build positive and meaningful relationships with others;
4. Utilize Multiple-intelligence: People may learn and acquire information in different ways. The course will help the takers to identify, appreciate and make use of these

different types of intelligence and that will definitely increase their diversity tolerance and unconditional respect for others;

5. Cultivate resilience and well-being: The course aims to equip individuals with strategies and techniques to cope with challenges, setbacks, and stress. It emphasizes the development of resilience, emotional intelligence, and well-being to lead a balanced and fulfilling life.
6. Foster values-based decision-making: The course emphasizes the importance of values in decision-making processes. It aims to develop individuals' ability to make ethical and value-based choices in their personal and professional lives.

Teaching-learning Methodology:

Emphasis will be on the grooming of Emotional Intelligence & Ethics. The pedagogy of Social Emotional Learning (SEL) will be followed where students are expected to take an active part in the learning process. Lectures will cover the bare conceptual part of the topic and it will be supplemented by a number of interactive and participatory tools like creation of joint experiential space, making meaning and teaching complex thinking through relatable stories, role-plays, problem-based learning, etc. In tutorials and skill workshops students will be grouped into small teams and various exercises involving inter and intra-group interactions will be given to enable them to understand their own life experience from different perspectives. Some guest talks can also be arranged, whenever needed.

Probable Teachers/ Instructors:

Any teacher with some background in Philosophy, Psychology, Linguistics, any discipline under Social Science or anyone with some orientation in Personality Development and/or Value Workshops will be able to handle the course.

Course-outline (30 hours/ 2-credits)

Module I: Self-Awareness (5 hours)

- Value yourself: Realize, Understand, Label, Express & Regulate your emotions (RULER Principle);

- Quite your Mind: Practice Mindfulness (living in present), Concentration (attention & focus) & Relaxation (breathing exercises);
- Know your personality: Body-mapping of emotions, Multiple intelligence, Personality types & understanding persona (situation specific Thought-Feeling-Expression-Action);
- Motivate Yourself: Extrinsic Motivation (reward & punishment) and Intrinsic Motivation (sense of purpose & mastery);
- Goal setting: Set realistic goals, make it SMART (Specific, Measurable, Attainable, Relevant & Time-bound), prepare an Action Plan;

Module II: Relationship Building & Social Awareness (5 hours)

- Ethical Foundation of Relationship: Core Values, Relationship Tree & Exploring personal needs in relations;
- Perspective & Mindset: Common biases in understanding perspective, Fixed Vs. Growth Mindset, Diversity tolerance, Emotional Judge & Emotional Scientist ;
- Empathy & Compassion: Noticing, Feeling & Responding; Emotion Scientist & Emotion Judge;
- Get help when needed, Not expect mind reading, Gratitude Diary;
- Teamwork & Cooperation: Understanding interdependence, solving complex problems through teamwork;

Module III: Effective Communication (5 hours)

- Modes of communication: Verbal- Speaking, Listening, Non-verbal- Postures & Gestures, Silence;
- Types of Communication: Passive, Aggressive, Passive-aggressive & Assertive;
- Team Skill: Adaptability & Flexibility, Negotiation, Collaboration;
- Leadership: Self Leader, Leading Others, Best Follower;
- Resilience: Understanding Resilience, Resilience in face of Social Challenges, Unconditional Positive Regards for Difference & Diversity;

Module IV: Self-Management (5 hours)

- Be Mindfulness: Live in present, be focused & conscious, no worry about past or fear about future, practice mindful listening, increase observation power;
- Recognize Multiple Intelligence: Spatial (visual), Verbal (linguistic), Interpersonal, Intrapersonal, Logical (mathematical), Kinesthetic (bodily), Musical, Naturalistic;
- Build up Self-confidence: Identify your strong points, identify the nature of your innate intelligence, build up positive relationships, be kind to yourself, learn to be assertive, say NO effectively, give yourself a challenge;
- Self-care: self-expression, self-care & selfishness, recognize burnout, personal grooming, time management & multi-tasking;

- Self-management & Behavior Optimization: 5-A's of behavior optimization (Ask, Advise, Assess, Assist & Arrange);

Module V: Change Management & Stress Management (5 hours)

- Accept Changed Situation & Assess-Plan-Review; to cope replace "React" with "Response", be flexible & remember that change is a part of life;
- Burn out and Decision Making: Decision fatigue, irrational decision, unnecessary risk-preference, coping with physical exercise, increased social connectivity, writing gratitude journal, etc.
- Understanding Stress: Stressor, Manifestation of Stress,
- Managing Stress: Coping with Problem-focused Strategies, Emotion-focused Strategies, Meaning making, Social Support, Religious coping, etc.
- Role of Attitude & Commitment

Module VI: Responsible Decision Making & Resolving Conflicts (5 hours)

- Understanding Conflict: Internal Vs. External
- Management Strategies: Avoidance, Diffusion, Confrontation
- Negotiation: Win-win, Win-lose, Lose-lose;
- Strength-Weakness-Opportunity-Threat (SWOT) Analysis in terms of balancing EQ (Emotional Quotient) & IQ (Intelligence Quotient)
- Etiquettes, Ethics & Values: personal, professional & social

Suggested Readings:

Since the course will ideally draw resources from multiple sources, fitting the life-experience of the students and instructors to make it as much experiential and relatable as possible, hence, the emphasis on reading will be relatively less. **The university should compile a volume on the background basics to be used in setting and answering MCQ questions**. In spite of that a basic few books are given below.

1. Corey & Corey (2010): I Never Knew I Had a Choice: Explorations in Personal Growth;
2. Ford (1997): Game Plan: A Guide for Improving Human Relations and Personal Adjustment;
3. Johnson (2009): Reaching Out: Interpersonal Effectiveness and Self-actualization;
4. Brackett (2019): Permission to Feel- The Power of Emotional Intelligence to Achieve Well-being & Success;
5. Clear, J. (2018): Automatic Habits;
6. Gladwell, M. (2007): Blink;
7. Divyanandaprana, Pr. (2022): Self-Discovery;