

4. Nakra, C. P. 2003. *Farm Machines and Equipment*. Dhanpat Rai and Publishing Co.
5. Smith, H. P. and Wilkes, L. H. 2011. *Farm Machinery and Equipment*. McGraw Hill Publication, New York.
6. Srivastav, A. K., Goering, C. E. and Rohrbach, R. P. 2005. *Engineering Principles of Agricultural Machines*. ASAE. St. Joseph, Mich.
7. Srivastava, A. C. 1991. *Elements of Farm Machinery*. Oxford and IBH Publication.
8. Srivastava, T. K. 2007. *A Work Book on Practical Farm Machinery* (Vol. I and II). Saroj Prakashan, Allahabad.

## Physical Education, First Aid, Yoga Practice and Meditation

2 (0+2)

### Objectives

1. To make the students aware about Physical Education, First Aid and Yoga Practices
2. To disseminate the knowledge and skill how to perform physical training, perform first aid and increase stamina and general wellbeing through yoga.

### Practical

Physical education; Training and Coaching - Meaning and Concept; Methods of Training; aerobic and anaerobic exercises; Calisthenics, weight training, circuit training, interval training, Fartlek training; Effects of Exercise on Muscular, Respiratory, Circulatory and Digestive systems; Balanced Diet and Nutrition: Effects of Diet on Performance; Physiological changes due to ageing and role of regular exercise on ageing process; Personality, its dimensions and types; Role of sports in personality development; Motivation and Achievements in Sports; Learning and Theories of learning; Adolescent Problems and its Management; Posture; Postural Deformities; Exercises for good posture.

Yoga; History of Yoga, Types of Yoga, Introduction to Yoga

- Asanas: Definition and Importance, Padmasana, Gaumukhasana, hadrasana, Vajrasana, Shashankasana, Pashchimotana, Ushtrasana, Tadasana, Padhasana, Ardhanandrasana, Bhujangasana, Utanpadana, Sarvangasana, Parvatasana, Patangasana, Shishupalanasana– left leg-right leg, Pavanmuktasana, Halasana, Sarpasana, Ardhanandrasana, Sawasana
- Suryanamskara Pranayama (Definition and Importance) Omkara, Suryabhedana, Chandrabhedana, AnulomViloma, Shitali, Shitkari, Bhastrika, Bhramari
- Meditation (Definition and Importance), Yogic Kriyas (Kapalbhati), Trataka, Jalneti and Tribandha
- Mudras (Definition and Importance) Gyanmudra, Dhyana mudra, Vayumudra, Akashmudra, Pruthvimudra, Shunyamudra, Suryamudra, Varunmudra, Pranmudra, Apanmudra, Vyanmudra, Uddanamudra
- Role of yoga in sports
- Teaching of Asanas – demonstration, practice, correction and practice.

History of sports and ancient games, Governance of sports in India; Important national sporting events; Awards in Sports; History, latest rules, measurements of playfield, specifications of equipment, skill, technique, style and coaching of major games (Cricket, football, table Tennis, Badminton, Volleyball, Basketball, Kabaddi and Kho-Kho) and Athletics.

Need and requirement of first aid. First aid equipment and upkeep. First AID Techniques, First aid related with respiratory system. First aid related with Heart, Blood and Circulation. First aid related with Wounds and Injuries. First aid related with Bones, Joints Muscle related injuries. First aid related with Nervous system and Unconsciousness. First aid related with Gastrointestinal Tract. First aid related with Skin, Burns. First aid related with Poisoning. First aid related with Bites and Stings. First aid related with Sense organs, Handling and transport of injured traumatized persons. Sports injuries and their treatments.

## Semester IV

### Engineering Mathematics-II

3 (3+0)

#### Objective

To make the students acquainted with the application of various advanced mathematics such as vector calculus, Fourier series and Laplace transform and applications of numerical methods in engineering

#### Theory

Vector calculus: Scalar and vector point functions, vector differential operator Del, gradient of scalar point function, divergent and curl of vector point function and their physical interpretations, line, surface and volume integrals, Green's, Stock's and Divergence theorem (without proofs), functions of a complex variable, limit, continuity and analytic function, Cauchy-Reimann equations, harmonic functions.

Fourier series: Periodic functions, Euler's formulae, functions having arbitrary period, even and odd functions, half range series expansion, series expansion of functions with finite discontinuity; Laplace Transform: rules for Laplace transform and inverse Laplace transform, applications to find solutions of ordinary and simultaneous differential equations.

Numerical methods: Finite difference operators and their relationship, factorial notation. Newton's forward and backward interpolation formula, Newton's divide difference interpolation and Lagrange's interpolation formula, numerical differentiation and integration rule, numerical solutions of ODE by Taylor's series, Euler's and modified Euler's method, Runge-Kutta method of order four.

#### Suggested Readings

1. Grewal, B S. 2004. *Higher Engineering Mathematics*. Khanna Publishers Delhi.
  2. Narayan, S. 2004. *A Text Book of Vector*. S. Chand and Co. Ltd., New Delhi.
  3. Narayan, S. 2004. *Differential Calculus*. S. Chand and Co. Ltd., New Delhi.
  4. Narayan, S. 2004. *Integral Calculus*. S. Chand and Co. Ltd. New Delhi.
- Ramana, B. V. 2008. *Engineering Mathematics*. Tata McGraw-Hill, New Delhi.

### Theory of Structures

2 (1+1)

#### Objectives

To make the students acquainted with the principles of structural design and to enable them to design small and medium RCC and steel structures