- Definition and importance of life competencies, problem-solving and decision-making, interpersonal communication. Youth development programs
- Development of youth programs and policy at the national level, state level and voluntary sector; youth-focused and youth-led organizations
- Health, hygiene and sanitation. Definition needs and scope of health education; role of food, nutrition, safe drinking water, water borne diseases and sanitation (Swachh Bharat Abhiyan) for health; national health programs and reproductive health. Youth health, lifestyle, HIV AIDS and first aid. Healthy lifestyles, HIV AIDS, drugs and substance abuse, home nursing and first aid. Youth and yoga. History, philosophy, concept, myths, and misconceptions about yoga; yoga traditions and its impacts, yoga as a tool for healthy lifestyle, preventive and curative method.

Post-II semester

Internship (only for exit option for award of UG-Certificate)　　　10 (0+10)

Objective

To provide students with an opportunity to put into practice the skills they have learned while studying in the institute, so that in case they exit with UG-certificate, they will be able to get proper engagement/ employment and will be competent to start an enterprise.

Activity

The students will have internship/ training for 10 weeks' duration either in the parent institute (attaching the students to facilities such as farm machinery testing centre, incubation centres, prototype production facilities, etc.) or in industry, farm machinery service centre or related organisations involved in agri-engineering activities. The College/ University will facilitate attaching the students to the organisations.

After completion of internship, the students will have to submit a report on their learnings and also present in form of a seminar. The assessment will be based on the report / assessment received from the industry/ organisation and the report and the presentation made at the College. Ideally the weightage will be 50% each for both internal and external. The SAUs may modify the weightage and breakups.

Semester III

Engineering Mathematics-I　　　3 (3+0)

Objective

To make the students acquainted with the basic mathematics applied in engineering and their applications in solving engineering problems

Theory

Differential Equations: First order differential equations, exact and reducible to exact form by integrating factors, linear differential equation and Bernoulli's equation, equations of first order and higher degree, Clairaut's equation.

Higher order differential equations: Methods of finding complementary functions and particular integrals, methods of variation of parameters, Cauchy's and Legendre's linear equations, simultaneous linear differential equations with constant coefficients.

Differential calculus: Functions of two or more variables, Taylor's and Maclaurin's expansions, Maxima and minima.

Partial differential equations: Partial derivative and total derivative, homogeneous functions and Euler's theorem. Formation of PDE, higher order linear PDE with constant coefficients, solution of non-linear PDE, Charpit's method.

Integral calculus: Double integrals, change of order of integration, triple integrals, application of double and triple integrals to find area and volume.

Matrices: Elementary transformations, Gauss elimination, Gauss-Jordan method to find the inverse of a matrix. rank of a matrix, solution of linear equations, Eigen values and Eigen vectors, Cayley-Hamilton Theorem- its use to find inverse of the matrix, linear transformation, diagonalization of matrices.

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.

Engineering Physics   3 (2+1)

Objective

To make the students acquainted with applications of physics in engineering and different physical processes in agricultural engineering

Theory

Magnetism: Dia, para and ferro-magnetism- classification; Langrevin theory of dia, and para magnetism, adiabatic demagnetization, Weiss molecular field theory; Introduction to quantum mechanics: wave particles duality, deBroglie concept uncertainty principle, time dependent and time independent Schrodinger equation.

Spectroscopy: Qualitative explanation of Zeeman effect, Stark effect and Paschen back effect, Raman spectroscopy; Solid state physics: statement of Bloch function, bands in solids, effective mass, distinction between metals, insulators and semi-conductors.

Semiconductors: Intrinsic and extrinsic semi-conductors, law of mass action, determination of energy gap in semi-conductors, donors and acceptor levels; Superconductivity: super conductivity, critical magnetic field, Meissner effect, isotope effect, Type I and II superconductors, Josephsons effect, DC and AC squids, introduction to high T_c superconductors.

LASERS and MASERS: Spontaneous and stimulated emission, Einstein A and B coefficients, population inversion, He, Ne and Ruby lasers, Ammonia and Ruby masers; Holography and optical