Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	**Name of Course**	**Diploma Course in Agriculture Engineering**
2	**Course Code**	**305440**
3	**Max no. of Students**	25
4	**Duration**	2 year
5	**Course Type**	Full Time
6	**No. of Days per week**	6 days
7	**No. of hours per day**	7 Hrs
8	**Space require**	Theory Class Room – 200 sqft Practical Lab – 1000 sqft + 2 acre
9	**Entry qualification**	S.S.C. Pass
10	**Objective of syllabus**	To develop agriculture engineering skill in the student.
11	**Employment opportunities**	He can job in agricultural engineering establishment.
12	**Teachers Qualification**	1) For Vocational subject - B.Tech. (Agri. Engineering) 2) For Non Vocational Subject - Master Degree in Concern subject

13 **Teaching Scheme –**

Sr.	Subject	Subject Code	Clock Hours / Week		Total
			Theory	Practical	
1	**English (Communication Skill)**	90000001	2 Hrs	1 Hrs	3 Hrs
2	**Elective – I**		2 Hrs	1 Hrs	3 Hrs
3	**Elective – II**		2 Hrs	1 Hrs	3 Hrs
4	**Elements of Agriculture**	**30540001**	3 Hrs	8 Hrs	11 Hrs
5	**Farm Mechanics**	**30540032**	3 Hrs	8 Hrs	11 Hrs
6	**Farm Structure & Electrification**	**30540069**	3 Hrs	8 Hrs	11 Hrs
Total					**42 Hrs**

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14	**Internship**	Two Months Summer Internship from 1st May to 30th June is Compulsory.

15 **Examination Scheme – Final Examination will be based on syllabus of both years.**

Paper	Subject	Subject Code	Theory			Practical			Total	
			Duration	Max	Min	Duration	Max	Min	Max	Min
1	**English (Communication Skill)**	90000001	3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
2	**Elective – I**		3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
3	**Elective – II**		3 Hrs	**70**	**25**	3 Hrs	**30**	**15**	**100**	**40**
4	**Elements of Agriculture**	**30540001**	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
5	**Farm Mechanics**	**30540032**	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
6	**Farm Structure & Electrification**	**30540069**	3 Hrs	**100**	**35**	3 Hrs	**100**	**50**	**200**	**85**
									900	**375**

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16 **Teachers** – Three Teachers per batch for vocational component. For English, Elective-I & II guest faculty on clock hour basis.

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a) For Elective I – Student can choose any one subject

Code	Subject Name
90000011	Applied Mathematics
90000012	Business Economics
90000013	Physical Biology (Botany & Zoology)
90000014	Entrepreneurship
90000015	Psychology

b) For Elective II – Student can choose any one subject

Code	Subject Name
90000021	Applied Sciences (Physics & Chemistry)
90000022	Computer Application
90000023	Business Mathematics

Subject :- Elements of Agriculture – 1st Year

(Subject Code - 30540001)

Theory	Practicals
1. Introduction to Agriculture- Definition, branches, importance, scope, constraints, Classification of plants by various methods. Dry land, sustainable agriculture, cropping schemes. general practices like intercropping, mix cropping, crop rotation relay crop, multiple cropping, tier cropping, etc. **2. Meteorology**- Study of climate, weather, atmosphere, factors of climate, optimum, minimum and maximum range of factors their impact on crops. Assessment of climatic factors. Forcasting weather. Agro climatic zones of India and Maharashtra. Adverse climate, prevention and control, wind breaks planting, importance, smoking etc. **3. Soil and its properties-** Soil definition, development of soil, soil genesis, properties of soil (chemical, physical & Biological) productivity of soil, problems and correction of soil. Types of soil, soils of Maharashtra and India. Soil pollution, impact of soil pollution, study of pollutants. **4. Plant nutrients**- Definition, importance, classification, types (organic, inorganic, bio-fertilizer) Types of inorganic nutrients. Deficiency symptoms, application methods, organic farming, natural farming, difference between two, application of bio-fertilizers. Organic farming and environment. **5. Agricultural botany-** plant cell, study of plant parts and their modifications. Reproduction in plants, pollination, fertilization, seed formation. Definition of plant breeding, importance, improvement of crops. Hybridization, crossing, Mendle's laws, principles of plant breeding. **6. Agricultural engineering-** Tractors, type, parts, working, two stroke engine, four stroke engine, land surveying and leveling, land utilisation, land resource management, drainage soil erosion, soil conservation, watershed management types, development, and structures.	1. Identification and Study of meteorological instruments specially rain guages, wet and dry bulb thermometer, anemometer, Stevanson screen, hygrometer, etc. 2. Study of soil profile 3. Soil Sampling and testing for fertility and chemical properties. 4. Calculating fertilizer requirement with available fertilizers and required standard. 5. Study preparation of compost by various methods. 6. Study methods of preparation of bio-fertilizers. 7. Study preparation of vermiculture. 8.Study of floral parts 9. Practicing emasculation and pollination. 10. Measurement of soil moisture content by tensiometer and oven method 11. Study of water conservation methods (check bund,brushwood, loose bolder, agri.ponds, etc.). 12. Drawing contour lining. 13. Measurement of agricultural land. 14. Study of parts of tractor and their function with minor repairing. 15. Operating and repairing of farm implements like rotavator, plough, harrow, hoes etc. 16.Study of drip and sprinkler irrigation system, Assembly and maintenance. 17. Identification and study of farm implements and machinery used for agricultural operations 18. Installation, working and study of electric motor, pump and starter 19. Preparation of various drinks from fruits and vegetables. 20. Preparation of processed (jam, jelly, Marmalade, ketchup, candy, sauce) products from agricultural produce. 21. Processing seeds for pulses and oil.

7. **Cultural operations and implements**- Tillage, ploughing, harrowing, leveling, hoeing, sowing, planting, staking, training, pruning, irrigation, weeding, manuring, spraying, harvesting, packing. Importance of these operations and tools and study of equipment used for it, rotovator, tillers, motor pump, etc. **8. Processing of agricultural produce- Importance,** Principles of preservation, spoilage of processed products, preservatives used, factors affecting preservation, packing of processed products (bottling, canning), introduction of processed products (jam, jelly, marmalade, syrup, squashes, juice, cordials, candies, chips, etc.) of fruits, vegetables and other agronomical crops.	

Subject Name : Elements of Agriculture – 2nd Year
(Subject Code - 30540001)

1. Plant growth regulators and herbicides- Definition, importance, classification, application, hazards, herbicides, importance. **2. Plant protection-** Definition of pests, principles of pest control. Dissemination and spread of pest. Economically important Disease and insect pest of major crops like cereals, pulses, cash crops, oilseed, important fruits, vegetables and flowering crops. Pesticides, classification. Integrated Pest Management. Important weeds and their control. Principles of weed control. **3. Nursery Management and Green house technology-** Definition, importance, scope, selection of site, raising of seedlings, root stocks, scion, mother plants, Methods of plant propagation in important crops. Propagation media, structure (cold frame, hot frame, glass house, poly house, etc.) pots, irrigation system in nursery. Precaution and aftercare of nursery plants. Poly house-importance, types, construction, cultivation of some important crops in polyhouse like, rose, daisy, orchids, chrysanthemum, pepper. **4. Seed production-** definition, importance, purity, qualities and types of seed. Methods/steps in seed production, intercultural operations like, isolation, rouging, emasculation, method of emasculation. Production of hybrid seeds. Harvesting and processing of seeds crop improvements in various important crops like cereals, pulses, vegetables, fruits, oilseeds and cash crops. **5. Animal husbandry-** Farming and rearing of animals (cow, bull, Buffaloes, goat, pig, sheep), poultry birds, insects (silkworm, bees) fishes, mushroom. Importance, vaccinations, domestic and exotic breeds, balanced diet management, reproduction, first aid, disease management, Farm products like milk, flesh, eggs, honey, birds, silk, manures etc.	1. Identification and control of weeds. 2. Preparation of bio-pesticides like HNPV, neem seed extract. 3. Preparation of Neem extract, Bordeaux mixture, Bordeaux paste, lime sulphur solution. 4.Preparation of pesticides and hormonal solution of required concentrations for plant application. 5. Identification and control measure of economically important insect and diseases of crops. 6. Planning and layout of nursery. 7. Identification of propagation media. 8. Practicing methods of vegetative propagation. 9. Planning and layout of poly house. 10. Preparation and sterilization of nursery beds and ridges and furrows. 11. Study media used in poly house for planting 12. Production of seeds of some cereals, pulses, oilseed or cash crop Or vegetables. 13. Study of various seed treatment. 14. Seed testing for germination, vigour and health. 15. Selection of milking animals. 16. First aid and vaccination to farm animals. 17. Milking and regulation of lactation in animals. 18. Milk testing for fats, gravity, acidity and TSS. 19. Identification of milk adulteration. 20. Preparation of various milk products. 21. Methods of preservation of milk. 22. Planning and layout of Poultry . 23. Planting mulberry for sericulture. 24. Study of life cycle of silkworm

6. Dairy Technology- Definition, importance, scope, limitation, nutritive importance of milk, properties of milk, preservation of milk and milk products. Causes of spoilage. Milk testing for ingredients (water, sugar, fats, total soluble solids, etc.). Various milk products like mawa, butter, paneer, cheese, cream, curd, yoghurt, kulfi, soft and cold drinks of milk. Adulteration of milk and various test of adulteration.	

Subject :- Farm Mechanics – 1st Year

(Subject Code - 30540032)

1. **Farm shop practice**- smithy-tools used in smithy, their use and maintenance, carpentry- tools use in carpentry, their use and maintenance, fitting- tools used in chipping, cutting, sawing, filing, drilling, tapping, their use, care and maintenance, welding- tools and equipments used in electric and gas welding, soldering and brazing.

2. **Oil engines**- I.C. engines, construction, parts, fuel pump and injection, carburetor and ignition system, governing system, cooling system, lubrication system, calculation of mechanical efficiency.

3. **Irrigation pumps**- reciprocating pumps, centrifugal pumps- principles, operation and their types and application, starting of centrifugal pumps, capacity and size for irrigation purposes.

4. **Tractor-** classification of tractors, tractor parts, clutches, gear box, differential, brake system, wheels, tyres, steering mechanism, tractor systems- transmission , hydraulics, PTO final drive.

5. **Farm implements**- tillage, primary and secondary tillage implements, bullock and tractor drown implements, agriculture machines, plant protection equipment, combine harvesters, threshers, dryers, and other crop processing machinery.

Subject :- Farm Mechanics – 2nd Year

(Subject Code - 30540032)

1. **Electrical moters**- types, their rating, application, performance, speed control, speed control, switches and fuses, safety rules.

2. **Land measurement and mapping-** chain survey, compass survey, plane table survey, principles of leveling and contouring, plotting and mapping.

3. **Soil and water conservation**- soil eroson process, kinds and forms of eroson, control measures and structures used, gully control, use and selection of farm pond, watershed management- objects, approach and planning.

4. **Irrigation**- water requirements of crops- duty consumptive use, different method of irrigation, irrigation scheduling, land grading, leveling and land preparation foe irrigation, estimation and calculation of earth work, conveyance and control of irrigation water, sprinkler irrigation system.

5. **Drainage**- need and benefits of drainage, drainage properties of soils, drainage co-efficient and drainable porosity, methods of drainage- surface and sub-surface of drainage and their types, open ditch system, estimation and installation of drainage system, management of saline and alkali soils.

Subject :- Farm Structure & Eletrification – 1st Year

(Subject Code - 30540069)

1. **Farm structure-** different types of farm fences used in India, cost estimate of barbed wire fencing with examples, farmstead , selection of best site for farmstead , study of silo pits, design and working cost of pit silo with examples, design and layout of farmhouse. Structure of polyhouse and greenhouse.

2. **Leveling-** definition and leveling concept,level surface, level line, horizontal plane, horizontal line, vertical line, vertical plane, datum, elevation, bench work, back sicht, form sicht, intermediate sicht, turning point, station,type of level- hand level, abney level, wye level, farm level, dampy level, type of leveling- simple, differential, check, profile, cross section, reciprocal, proceed, contour.

3. **leveling equipment**- terminology, methods of calculation of reduced levels, contour line and its characters, use of contour map, land development, land leveling design, methods of land leveling- plane method, profile method, plan inspection method, contour adjustment method, earth work calculation.

4. **Leveling for irrigation-** simple and differential, definition and concept of micro-irrigation,types of micro- irrigation, drip irrigation, perforated tapes, bubbler irrigation and micro- irrigation, requirement of emitters, lateral, manifold and main line, layouts, steps and designing the micro- irrigation systems, system head and discharge calculations.

5. **Water lifting devices** – pumps (for open and tube well), discharge, head and power calculations, Irrigation water measurement through weirs, flumes and orifices, selection of pumps performance evolution of systems, fertigation, management and maintenance of the system.

Subject :- Farm Structure & Eletrification – 2nd Year

(Subject Code - 30540069)

1. **Electric circuit-** ohms law, resistance and their S.i. units, series-parallel resistive circuits, effect of temperature on resistance, S.I. units work, power and energy.

2. **Secondary cell-** types, their charging methods, care and maintenance of batteries.

3. **Domestic wiring-** materials used in house wiring, types of wiring, use of main and sub-distribution boards, megger and its use, necessity of earthing, I.E.E. rules regarding domestic and industrial wiring.

4. **Instruments-** operating principles and connections of permanent magnet moving coil and moving iron type ammeters, voltmeters, dynamometer type wattmeter.

5. **D.C. generators and motors-** various parts, and function of each parts, types of D.C. motor starters- their connections and internal details, care and maintenance of D.C. machines.

6. **General principle of single and three phase induction motor-** types, schematic representation of these motors, necessity of starters, types of starters-resistance, star delta, rotor resistance starter and autotransformer starter, reversal of rotation, speed control of motors, and its application.

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