छत्रपति साहू जी महाराज विश्वविद्यालय, कानपुर

(पाठ्यक्रम समिति की बैठक की कार्यवाही)

दिनांक 15.05.2021 की अपरान्ह 03:00 बजे कृषि संकाय के कृषि अभियंत्रण विभाग के विषयों हेतु पाठ्यक्र समिति के बैठक की संस्तुतियाँ :–

1. वर्तमान में प्रचलित पाठ्यक्रम में आवश्यकतानुसार संशोधन की संस्तुतियाँ–

अ–स्नातक पाठ्यक्रम :

प्रस्तुत किये गये पाठ्यक्रम में कृषि अभियंत्रण विभाग के विषयों (प्रश्नपत्रों) के अवलोकनोपरान्त समिति का प्रेषण निम्नवत् है :

(i) आई0सी0ए0आर0 की पांचवीं डीन्स कमेटी रिपोर्ट की संस्तुति के अनुसार बी0एस–सी (कृषि) पाठ्यक्रम में निम्नलिखित चार कृषि विषय कृषि अभियंत्रण विभाग को सौंपे गये हैं:

S.No.	Course Title	विश्वविद्यालय द्वारा आवंटित कोर्स कोड	Credits
1.	Farm Machinery and Power	AG-306	02
2.	Soil & Water Conservation Engg.	AG-310	02
3.	Renewable Energy and Green Technology	AG-406	02
4.	Protected Cultivation and Secondary Agriculture	AG-505	02

उपरोक्तानुसार सत्र 2019–20 से नया पाठ्यक्रम लागू करने हेतु सम्पन्न बोर्ड आफ स्टडीज की बैठकों में निर्णय लिया गया था जिसमें यह भी संस्तुति की गई थी कि तृतीय सेमेस्टर में पढ़ने वाले दो विषयों ((a) Soil & Water Conservation Engg. एवं (b) Farm Machinery and Power) के एक ही सेमेस्टर में पड़ने के कारण किसी एक विषय को द्वितीय सेमेस्टर में Shift कर दिया जाय। फलस्वरूप बाद में Soil & Water Conservation Engg. को द्वितीय सेमेस्टर में कर दिया गया था।

(ii) आज की बैठक में जो पाठ्यक्रम प्रस्तुत किया गया है उसमें "Soil & Water Conservation Engg." विषय का कोर्स टाइटिल बदलकर "Fundamental of Soil and Water Conservation" कर दिया गया है जबकि कोर्स कन्टेन्ट "Soil & Water Conservation Engg." का ही है एवं कृषि अभियंत्रण विभाग के उक्त विषय को भूमि संरक्षण विभाग में कर दिया है जो कि आईसीएआर की 5वीं डीन्स कमेटी की संस्तुतियों के विरूद्ध है एवं Agricultural Engineering Discipline के साथ नाइंसाफी है। इसे संशोधित करने की आवश्यकता है।

(iii) Agricultural Engineering Discipline के चार विषयों (कुल 08 क्रेडिट) में से एक विषय ''Soil & Water Conservation Engg.'' को हटाकर (जिसका नाम बदलकर Soil conservation discipline को दे दिया गया है) केवल तीन विषय ही कृषि अभियंत्रण विभाग के अधीन रखा गया है एवं सब्जेक्ट टाइटिल के सामने गलत ढंग से क्रेडिट लिखकर 08 क्रेडिट्स जस्टीफाई करने का प्रयास किया गया है।

1.	Farm Machinery and Power	03 Credits
2.	Renewable Energy and Green Technology	02 Credits
3.	Protected Cultivation and Secondary Agriculture	03 Credits
	Total	08 Credits

यद्यपि उपरोक्त अंकित तीन क्रेडिट के दोनों विषयों का कोर्स कंटेन्ट दो क्रेडिट वाला ही रखा गया है। 08 क्रेडिट्स का उक्त जस्टीफिकेशन मात्र बोर्ड के सदस्यों एवं सम्बन्धित अधिकारियों को भ्रमित करने के लिए किया गया है।

यह सुझाव है कि बिन्दु 01 में दर्शाये चारों विषयों को कोर्स टाइटिल एवं क्रेडिट्स के साथ Agricultural Engineering Discipline (विभाग) में ही रखा जाना नियम संगत एवं पांचवीं डीन्स समिति की संस्तुतियों के अनुरूप होगा।

उपरोक्त विभिन्न विषयों के पाठ्यक्रमों में पायी गयी कमियाँ एवं उनका निराकरण निम्नवत् है–

विषय / प्रश्नपत्र	त्रुटियाँ एवं उनका निराकरण
Farm Machinery and Power	
Theory	चौथी लाइन में Familiarization with different system of IC Engine के बाद एवं Air cleaning से पहले "Compression Ignition and spark ignition" Add करना है।
Practical	प्रैक्टिकल में पांचवीं लाइन में मोल्ड प्लाऊ के स्थान पर मोल्ड बोर्ड प्लाऊ होना चाहिए।
Renewable Energy and Green Technology	
Theory	पहले पैरा की पहली लाइन में "Contribution of these of sources of energy in agricultural" के स्थान पर "Contribution of these sources of energy in agricultural" लिखना है।
Theory	पांचवीं लाइन में Solar distillation एवं Introduction of wind energy के मध्य "Solar photovoltaic System and their application" जोड़ना है।

Protected Cultivation and Secondary Agriculture	
Theory	पहले पैरा के अन्त में Green house drying के बाद "Cost estimation and economics analysis" जोड़ना है। दूसरे पैरा की दूसरी पंक्ति में PHT equipment design and operation एवं drying and dehydration के बीच "including processing and quality standard जोड़ना है।

Note: On 15.05.2021 during virtual meeting of Board of Studies of Agril. Engg. subject, it was realise that an important aspect of engineering i.e. "Surveying and levelling" is left in the B.Sc. Ag. Program. In fact, the knowledge of surveying and levelling is very important in horizontal and vertical measurement of agricultural land. Earlier this portion was available with agricultural engineering subjects in B.Sc. Ag. program. Here it is to mention that even the course "Surveying and levelling" is a part of the syllabus of agricultural engineering in U.P. Higher Education. It is therefore, recommended that "surveying and levelling" may be added with subject "soil and water conservation engineering" without changing the credit load of the subject. The course content of "**Surveying and levelling**" is given as below:

"Linear measurements, Chain surveying, Compass survey. Planimeter, Errors in measurements, their elimination and correction. Plane table surveying. Levelling, levelling difficulties and error in leveling, Contouring. Introduction to GPS survey".

Recommended Syllabus of BSc (Ag) pertaining to

AGRICULTURAL ENGINEERING

(Necessary corrections and additions are incorporated in the syllabus in bold letters with underlines)

1. Farm Machinery and Power

2(1+1) AG-306

Theory

Status of Farm Power in India, Sources of Farm Power , I.C. engines, working principles of I C engines, comparison of two stroke and four stroke cycle engines , Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: **Compression ignition and spark ignition,** Air cleaning, cooling, lubrication ,fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor , Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations, Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment, Familiarization with harvesting and threshing equipment.

Practical

Study of different components of I.C. engine. To study air cleaning and cooling system of engine, Familiarization with clutch, transmission, differential and final drive of a tractor. Familiarization with lubrication and fuel supply system of engine. Familiarization with brake, steering, hydraulic control system of engine. Learning of tractor driving. Familiarization with operation of power tiller, implements for hill agriculture. Familiarization with different types of primary and secondary tillage implements: mould **board** plough, disc plough and disc harrow. Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter. Familiarization with different types of sprayers and dusters. Familiarization with different inter-cultivation equipment. Familiarization with harvesting and threshing machinery.

Books References

1. *Farm Power machinery and surveying by Irshad Ali, Publication – Kitab Mahal, Allahabad.*
2. *Farm Power by Manoj Kumar Ghosal and Dhirendra Kumar Das by Kalyani Publisher.*
3. *Principles of agricultural engineering vol. 1 by A.M. Michael and T.P. Ojha, pub.- Jain Brother's, New Delhi.*
4. *Elements of agricultural engineering by Dr. Jagdishwar Sahai, Pub. – Standard Publisher, New Delhi.*
5. *IC Engines – Rogowsky (International Books Co.).*
6. *Internal combustion engine and air pollution – E.F. Obert (Harper & Row, New York).*
7. *IC Engine – Ganeshan (Tata McGraw Hill)*
8. *IC Engine – R. Yadav (Central Publishing House).*
9. *Fundamentals of internal combustion engine – Gill, Smith, Ziurs (Oxford and IBH Publishing Co.).*
10. *Fundamental of combustion – D.P. Mishra (PHI Learning Pvt. Ltd.).*

2. Soil and Water Conservation Engineering

Theory 2(1+1) AG-310

Introduction to Soil and Water Conservation, causes of soil erosion. Definition and agents of soil erosion, water erosion: Forms of water erosion. Gully classification and control measures. Soil loss estimation by universal Loss Soil Equation. Soil loss measurement techniques. Principles of erosion control: Introduction to contouring, strip cropping. Contour bund. Graded bund and bench terracing. Grassed water ways and their design. Water harvesting and its techniques. Wind erosion: mechanics of wind erosion, types of soil movement. Principles of wind erosion control and its control measures.

"Linear measurements, Chain surveying, Compass survey. Planimeter, Errors in measurements, their elimination and correction. Plane table surveying. Levelling, levelling difficulties and error in leveling, Contouring. Introduction to GPS survey".

Practical

General status of soil conservation in India. Calculation of erosion index. Estimation of soil loss. Measurement of soil loss. Preparation of contour maps. Design of grassed water ways. Design of contour bunds. Design of graded bunds. Design of bench terracing system. Problem on wind erosion.

Chain survey of an area and preparation of map; Compass survey of an area and plotting of compass survey; Plane table surveying; Knowledge of instruments for Levelling; Contour survey of an area and preparation of contour map.

Books References

1. **Introductory Soil & Water Conservation Engg. by Dr. B.C. Mal and Dr. Ashish Pandey, Kalyani Publishers.**
2. **Soil & Water Conservation Engg. by R. Suresh pub. Standard Publishers and Distributors, New Delhi.**
3. **Land and water Management Engg. by V.V.N. Murthy, Kalyani Publishers.**
4. ***Surveying (Vol.I). Punmia, B C 1987. Laxmi Publications, New Delhi.***
5. ***Surveying (Vol.I), Arora K R 1990. Standard Book House, Delhi.***
6. ***Surveying and Levelling. Kanetkar T P 1993. Pune Vidyarthi Griha, Prakashan, Pune.***

3. Renewable Energy and Green Technology 2(1+1) AG-406

Theory

Classification of energy sources, contribution of **these sources of energy in** agriculture sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers, biogas, bio-alcohol, biodiesel and bio-oil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, solar photovoltaic system and their application, introduction of wind energy and their application. introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. Study of biogas plants, Study of gasifier, Study the production process of biodiesel, Study of briquetting machine, Study the production process of bio-fuels. Familiarization with different solar energy gadgets. Study of solar photovoltaic system: solar light, solar pumping, solar fencing. Study of solar cooker, Study of solar drying system. Study of solar distillation and solar pond.

Books References

1. *Fundamental of renewal energy sources by G.N. Tiwari and M.K. Ghosal.*
2. *Renewable energy sources and conversion Technology by Bansal Keemann Meliss (Tata McGraw Hills).*
3. *Renewable energy sources and emerging Technologies – Kothari D.P. (Prentice Hall of India).*
4. *Non-conventional energy sources by Rajesh Kumar Prasad and T.P. Ojha, Pub. Jain Brothers, New Delhi.*
5. *Non-conventional energy – Ashok V. Desai (New Age International Publisher Lt.)*
6. *Solar energy and non-conventional sources by V.M. Domkundwar and Anand V. Domkundwar pub. Dhanpat Rai & Co.*

4. Protected Cultivation and Secondary Agriculture 2(1+1) AG-505

Theory

Green house technology: Introduction, Types of Green Houses; Plant response to Green house environment, Planning and design of greenhouses, Design criteria of green house for cooling and heating purposes. Green house equipment, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying. *Cost estimation and economic analysis.*

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals, pulses and oilseed, their application in PHT equipment design and operation **including processing and quality standard;** drying and dehydration; moisture measurement, EMC, drying theory, various drying method, commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer, recirculatory dryer and solar dryer). Material handling equipment; conveyer and elevators, their principle, working and selection.

Practical

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipment. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.

Books References

1. *Post-harvest technology of serials, pulses and oilseeds by Dr. A. Chakravorti, pub. Oxford and IBH Publishing Co.*
2. *Principles and practices of post-harvest technology by Dr. P.H. Pandey pub. Kalyani Publishers.*
3. *Green house management for horticultural crops by S. Prasad, S. Kumar and B. Kumar.*

List of External Examiners for paper setting, practical examination and Evaluation of answer books

1. Prof. Er. Ram Kishore, Ex. Dean and Prof. NDU&T, Ayudhya (Alkhananda Apartment Q4, Gomti Nagar Ext., Lucknow), Mob. 9450764740
2. Dr. L.S. Yadav, Ex. Prof. & Director, Ganga Sadan, HIG-116, Near Shivam Akshyabat Hospital, ADA Colony, Po- Naini, Prayagra-211008, Mob. 7985948379
3. Dr. Raj Mani Maurya, Rtd. Asstt Professor (Agril Engg), H.No. 7/7/173 (H), New Colony, Lalbagh, Faizabad (Ayodhya), UP, PIN 224001, Mob.9415966813, 8423790960
4. Er. Lalmani, Asstt. Prof., Agril. Engg, CSAU, Kanpur, Mob. 9450134122
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DEPARTMENT OF AGRICULTURAL ENGINEERING

Course Code	Course Title	Credit Hours
AG-306	Farm Machinery and Power	3(2+1)
AG-406	Renewable Energy and Green Technology	2(1+1)
AG-505	Protected Contribution and Secondary Agriculture	3(2+1)

AGRICULTURAL ENGINEERING

1. Farm Machinery and Power

Theory **2(1+1) AG-306**

Status of Farm Power in India, Sources of Farm Power, I.C. engines, working principles of I.C. engines. comparison of two stroke and four stroke cycle engines Study of different components of I.C. engine, I.C. engine terminology and solved problems, Familiarization with different systems of I.C. engines: Air cleaning, cooling, lubrication, fuel supply and hydraulic control system of a tractor, Familiarization with Power transmission system : clutch, gear box, differential and final drive of a tractor, Tractor types, Cost analysis of tractor power and attached implement, Familiarization with Primary and Secondary Tillage implement, Implement for hill agriculture, implement for intercultural operations. Familiarization with sowing and planting equipment, calibration of a seed drill and solved examples, Familiarization with Plant Protection equipment. Familiarization with harvesting and threshing equipment.

Practical

Study of different components of I.C. engine. To study air cleaning and cooling system of engine. Familiarization with clutch, transmission, differential and final drive of a tractor, Familiarization with lubrication and fuel supply system of engine, Familiarization with brake, steering, hydraulic control system of engine, Learning of tractor driving. Familiarization with operation of power tiller, Implements for hill agriculture, Familiarization with different types of primary and secondary tillage implements: mould plough, disc plough and disc harrow. Familiarization with seed-cum-fertilizer drills their seed metering mechanism and calibration, planters and transplanter Familiarization with different types of sprayers and dusters Familiarization with different inter-cultivation equipment. Familiarization with harvesting and threshing machinery.

2. Renewable Energy and Green Technology

Theory **2(1+l) AG-406**

Classification of energy sources, contribution of these of sources in agricultural sector, Familiarization with biomass utilization for biofuel production and their application, Familiarization with types of biogas plants and gasifiers. biogas. bioalcohol, biodiesel and biooil production and their utilization as bioenergy resource, introduction of solar energy, collection and their application, Familiarization with solar energy gadgets: solar cooker, solar water heater, application of solar energy: solar drying, solar pond, solar distillation, introduction of wind energy and their application.

Practical

Familiarization with renewable energy gadgets. To study biogas plants, To study gasifier, To study the production process of biodiesel, To study briquetting machine, To study the production process of bio-fuels. Familiarization with different solar energy gadgets. To study solar photovoltaic system: solar light, solar pumping, solar fencing. To study solar cooker, To study solar drying system. To study solar distillation and solar pond.

3. Protected Cultivation and Secondary Agriculture 3(2+1) AG-505

Theory

Green house technology: Introduction, Types of Green Houses: Plant response to Green house environment, Planning and design of greenhouses. Design criteria of green house for cooling and heating purposes. Green house equipments, materials of construction for traditional and low cost green houses. Irrigation systems used in greenhouses, typical applications, passive solar green house, hot air green house heating systems, green house drying.

Important Engineering properties such as physical, thermal and aero & hydrodynamic properties of cereals. pulses and oilseed, their application in PHT equipment design and operation. Drying and dehydration; moisture measurement, EMC, drying theory, various drying method. commercial grain dryer (deep bed dryer, flat bed dryer, tray dryer, fluidized bed dryer. recirculatory dryer and solar dryer). Material handling equipment: conveyer and elevators, their principle, working and selection.

Practical

Study of different type of green houses based on shape. Determine the rate of air exchange in an active summer winter cooling system. Determination of drying rate of agricultural products inside green house. Study of green house equipments. Visit to various Post Harvest Laboratories. Determination of Moisture content of various grains by oven drying & infrared moisture methods. Determination of engineering properties (shape and size, bulk density and porosity of biomaterials). Determination of Moisture content of various grains by moisture meter. Field visit to seed processing plant.