ITM UNIVERSITY
GWALIOR • MP • INDIA
CELEBRATING DREAMS

Date of Meeting: 08-July-2023

Minutes of Meetings (BoS, School of Agriculture)

School of Agriculture has conducted a Board of Studies (BoS) meeting on 08-07-2023 from 12.00 Noon to 02.00 PM for upgrading the current course curricula of undergraduate and postgraduate programmes, and addition of new programme. Few changes in scheme & syllabus have been proposed in this BoS meeting along with the modification of the examination scheme for the batch 2023-24 onwards. The details of recommendations given by the panel members are attached.

Members of BoS

SN	Panel Members	Name	Designation	Organization	Signature
1	Chairperson	Dr. Shama Parveen	Dean, School of Agriculture	ITM University Gwalior, MP	08/July/2023
2	Member Secretary	Dr. Vinod Jatav	Assistant Professor , Horticulture (Vegetable Science)		08/7/23
3.	Coordinator	Dr. Swapnil Meshram	Assistant Professor , Genetics & Plant Breeding		08/7/23
3	Internal Members	Dr. Jai Dev Sharma	Professor & HOD, Agronomy		08.07.2023
4		Dr. C.K. Sharma	Professor & HOD Horticulture		08-07-2023
5		Dr. Awadhesh Sharma	Professor, Animal Science		8/7/2023
6		Dr. Sudheer Kumar Pathak	Assistant Professor & COD, GPB		08/07/2023
7		Dr. Prashant Kumar Singh	Assistant Professor & COD, Plant Pathology		08/07/2023
8		Dr. Nivedita Singh	Assistant Professor & COD, Soil Science & Agriculture Chemistry		8/7/23
9	External Member	Prof. R.L. Rajput	Ex-Director Instruction	RVSKVV, Gwalior, MP	8/7/23
10		Aditya Singh	Chief Executive Officer, Centre for Agribusiness Incubation and Entrepreneurship	NABARD	Aditya Singh 08/07/23
11		Nahar Singh Kushwaha	Progressive farmer	Gwalior	8/7/2023

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Agenda Points for BoS Meeting

1. Agenda and action taken plan for previous BoS (dated 17-August-2022)
2. Introduction of the new program
3. Schemes and syllabi of the new program
4. Introduction of value-added courses
5. Modification in the scheme
6. Modification in the syllabi
7. Updation in the examination scheme for the batch 2023-27 onwards
8. Addition of new courses
9. Any other points

Recommendations of Board of Studies

Agenda and action taken plan for previous BoS (dated 17-August-2022)

1. The agenda and action taken of BoS, dated 17-August-2022, was discussed

Agenda	ATR
Proposed changes in scheme	The proposal and recommendation of the change in the scheme of BoS was approved by academic council and was implemented.
Proposed changes in credits and course nomenclature	The proposal and recommendation of no change in the credit and syllabi of BoS was approved by academic council.
Proposed changes in syllabi	The proposal and recommendation of BoS was approved by academic council and was implemented.
Internship during Masters' programme	The new masters' programmes were approved by academic council and were introduced from session 2022-23.
READY programmes and New ELP Modules	The incorporation of IDEA was approved, and a committee was constituted for implementation of this programme. Committee has to submit report within 2 months.
Incorporation of MOOC/SWAYAM courses	The proposal and recommendation of the committee for incorporation of MOOC/SWAYAM courses was approved by the academic council and implemented.
Revision of Committee for final defence of Dissertation report in postgraduate programmes	The proposal and recommendation of the committee for revision of the committee for the defence of dissertation of PG program was approved by the academic council and implemented.

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2. **Proposed introduction of new program:** The introduction of new program (Ph.D. in Genetics and Plant Breeding) was proposed for approval in the BoS from the academic session 2023-24.

3. **Scheme and Syllabi of the new program:** The proposed scheme and syllabi of the newly introduced program (Ph.D. Genetics and Plant Breeding) was recommended for academic council after the BoS approval.

4. **Proposed introduction of value-added courses:** The introduction of course (Socialism in India: Yesterday, Today and Tomorrow) of 1 credits in B.Sc. (Hons.) Agriculture was proposed for approval in the BoS from the academic session 2023-24.

   Four new ELP modules ELP-AENG-401 Agri-based Software Design; ELP-AEXT- 402 Introduction to indigenous Technical Knowledge; ELP-FSC-401 Integrated Fish Farming; ELP-HORT-408 Processing, preservation and Value Addition in OMA Plants have been proposed, to be included in VIII semester of B.Sc.(Hons.) Agriculture Program from the academic session 2023-24 onwards.

5. **Modification changes in scheme:** Revision in the schemes of the batches: 2020-24, 2021-25, 2022-26 was proposed for approval from the academic council, for the programs: B.Sc. (Hons.) Agriculture, B.Sc. (Hons.) Horticulture and Bachelor of Fisheries Science (B.F.Sc.).

6. **Modifications in the syllabus:** Modifications in the syllabus of the courses, "BIOCHEM-BT-111 Fundamental of Plant Biochemistry and Biotechnology", "AEXT-121 Fundamentals of Agricultural Extension Education", "AGRON-223 Introductory Agrometeorology and Climate Change", "AEXT-311 Entrepreneurship Development and Business Communication", "AGRON-311 Geoinformatics and Nano-technology and Precision Farming", "ENT-321 Management of Beneficial Insect" and "ELP-AGRON-402 Organic Production Technology" in B.Sc. (Hons) Agriculture recommended to academic council.
   The percentage changes in syllabi of these subjects are as follows: 2.50%, 21.60%, 14.87%, 16.84 %, 19.87 %, 27.50%, 4.10%, and 4.00 %, respectively.
   (ANNEXURE-II)

   M.Sc. (Ag) Genetics and Plant Breeding: Syllabus revision: Syllabi of GPB-501 and SST-503 have been revised to bring synchronization between current need of Agro Industries, farmers, future scope and course and program outcomes. The percentage changes in syllabi of these subjects are as follows: 8.50% and 10.50 %, respectively.
   (ANNEXURE-II)

7. **Change in the examination scheme for the batch 2023-27 onwards:** The proposed change in the examination scheme was approved and recommended for the academic council.

8. **Addition of new courses:** Addition of the new courses viz; "ELP-AENG-401 Agri-based Software Design", "ELP-AEXT-402 Introduction to Indigenous Technical Knowledge", "ELP-FSC-401 Integrated Fish Farming, Processing", "ELP-HORT-408 Preservation and Value Addition in OMA Plants", "Molecular breeding and bioinformatics GPB-506", "Post-harvest handling and storage of seeds SST-508" and "Seed Developmental biology SST-501" for B.Sc. (Hons) Agriculture and M.Sc (Ag) GPB was

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recommended.

(ANNEXURE-I)

9. **Any other points:** The board has advised consulting the schemes of various universities/institutions for any necessary deviation from the BSMA committee/ V Deans Committee report.

All the agenda points of BoS were discussed in detail in support of necessary documents and same was recommended. The meeting was ended with vote of thanks by chairperson.

Dean & Chairperson (BoS)
School of Agriculture

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ANNEXURE-I

ITM UNIVERSITY
CELEBRATING DREAMS

Syllabus-2023-2024

(SOAG)(BSc_HonsAgriculture)

Title of the Course	Agri-based Software Design
Course Code	ELP-AENG-401 [P]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s				**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Gain knowledge of basic Software methods and practices and their appropriate application.**(BL1-Remember)** **CO2-** Describe software layered technology and Process framework.**(BL2-Understand)** **CO3-** Understanding of software requirements, designing an agri based software.**(BL3-Apply)** **CO4-** Understanding of implementation issues such as modularity and coding standards, software testing approaches.**(BL4-Analyze)** **CO5-** Describe software measurement and software risks, of softwareEvolution, Understanding on quality control and how to ensure good quality software.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗	**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land) SDG17(Partnerships for the goals)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Software Quality assurance, Software Metrics, Software Validation,Static and dynamic Analysis, Symbolic Equation. Mutation Analysis, Dynamic Testing, unit Testing, Whitebox and black box testing, Test Case Generation, Integration Testing.	PBL	BL2-Understand	30
Module 2	Bottom-up &Topdown Testing. System Testing, Function Testing,Performance Testing, Acceptance Testing, Installation Testing, theoretical foundation of Testing, Formal verification, Test Tools.	PBL	BL2-Understand	30
Module 3	Software Reliability; Software Complexity.Issues in ProjectManagement - Management Functions, Software Project Management Plan, Software management Structures, Personnel Productivity.	PBL	BL3-Apply	30
Module 4	Software project scheduling and the establishment of relationships among the different tasks.Tasks, dependencies and conflict resolution.Resource management and allocation.	PBL	BL4-Analyze	35
Module 5	Risk assessment and its impact in the planning and scheduling of software projects.	PBL	BL5-Evaluate	35

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Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	• Roger S. Pressman, Software Engineering – A Practitioner's Approach, Mcgraw-Hill, 2004. Bernd Bruegge and Allen H. Dutoit, Object-Oriented Software Engineering: Using UML, Patterns and Java, 2nd Edition, Prentice Hall, 2003Bernd. • Bruegge and Allen H. Dutoit, Object-Oriented Software Engineering: Using UML, Patterns and Java, 2nd Edition, Prentice Hall, 2003.
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO3	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO4	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2023-2024

(SOAG)(BSc_HonsAgriculture)

Title of the Course	Introduction to Indigenous Technical Knowledge
Course Code	ELP-AEXT-402 [P]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Core							
Pre-Requisite/s	Fundamentals of indigenous knowledge system			**Co-Requisite/s**				
Course Outcomes & Bloom's Level	**CO1-** Identify the concept of Indigenous Technical Knowledge and its importance.**(BL1-Remember)** **CO2-** Explain the need and importance of protecting ITK.**(BL2-Understand)** **CO3-** Illustrate various enactments related to the protection of technical knowledge**(BL3-Apply)** **CO4-** Interpret the concepts of Intellectual property to protect the technical knowledge.**(BL4-Analyze)** **CO5-** Assess the importance of ITK**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✗ Gender ✗ Human Values ✗ Environment ✗		**SDG (Goals)**	SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land) SDG17(Partnerships for the goals)				

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Introduction to Indigenous Technical Knowledge: Define ITK , nature and characteristics, scope and importance, kinds characteristics, knowledge vis- a-vis indigenous knowledge, traditional knowledge Vs western knowledge traditional knowledge	PBL	BL2-Understand	32
Module-2	Protection of Indigenous Technical Knowledge:The need for protecting traditional knowledge Significance of ITK Protection, value of ITK in global economy, Role of Government to harness ITK.	PBL	BL3-Apply	32
Module-3	Legal framework and ITK: The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, Plant Varieties Protection and Farmer's Rights Act, 2001 (PPVFR Act); The Biological Diversity Act 2002 and Rules 2004,.	PBL	BL4-Analyze	32
Module-4	Indigenous Technical Knowledge and intellectual property: Systems of ITK protection, Legal concepts for the protection of ITK, Patents, Strategies to increase protection of ITK	PBL	BL5-Evaluate	32
Module-5	Traditional Knowledge in Different Sectors: Traditional medicine system, ITK in agriculture, Traditional societies depend on it for their food and healthcare needs, Importance of conservation and sustainable development of environment, Management of biodiversity, Food security of the country and protection of ITK	PBL	BL6-Create	32

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Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO4	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2023-2024

(SOAG)(BSc_HonsAgriculture)

Title of the Course	Integrated Fish Farming
Course Code	ELP-FSC-401 [P]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of fisheries			**Co-Requisite/s**	Fish ecology and aquatic Ecosystem			
Course Outcomes & Bloom's Level	**CO1-** Integrate fish farming with other agricultural activities such as crop and livestock production **(BL2-Understand)** **CO2-** Promote sustainability by utilizing agricultural waste for reducing environmental pollution and recourse consumption **(BL2-Understand)** **CO3-** Apply fish farming to benefit multiple income streams providing financial stability **(BL3-Apply)** **CO4-** Analyze the recycling of nutrients from various within systems**(BL4-Analyze)** **CO5-** Evaluate various inputs design to minimize environmental impact by reducing pollution from the ecosystem **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG1(No poverty) SDG2(Zero hunger) SDG3(Good health and well-being) SDG6(Clean water and sanitation) SDG8(Decent work and economic growth) SDG12(Responsible consuption and production) SDG14(Life below water) SDG15(Life on land)					

Part B

Modules	Contents	Pedagogy	Hours

Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module 1	Selection of fish seed(spawn) production area /land: (a) Select a culturable fish species for polyculture .An average depth of 6.5 to 10ft depth should be maintained in the case of six species composite fish culture.	Field work	BL2-Understand	20
Module 2	Layoutpreparation/Culturalpractices:Netgross area & water area .calculation,Designofexperimentation,isolationdistance,Pondpreparation,fish seedstocking,and calculationofrequiredfish seeds (seedrate) Pre -stocking practices: Ploughing,Fertilizing the Pond ,Liming , Adding minerals etc.	Field work	BL2-Understand	20
Module 3	Fish farming cum Horticulture : Pond banks provide a suitable place which can be economically used for raising fruit and plants like banana ,papaya and vegetables.	Field work	BL2-Understand	20
Module 4	Fish farming with Livestock: In this practice excreta of Animals (poultry	Field work	BL3-Apply	20
Module 5	Fish cum duck Farming: Pond manuring, Aeration , weed removing and provide supplementary feed.	Field work	BL3-Apply	20
Module 6	Stocking size:Thesurvivalofthefingerlingsintroducedintoaparticularponddependsverymuchontheirsize:biggerthesize greater will be the survival rate and vice versa. The fingerlings stocked should have a size of 10 to 40 gm. Water Quality Management : Regular sampling of Physical and chemical water quality parameters	Field work	BL3-Apply	20
Module 7	Growth Promoter and medicines: Various growth promoter and medicines are being used for the growth and production of fish seed.	Field work	BL4-Analyze	20
Module 8	Post stocking Practice on Feed management: Natural feeding is being Provided for the growth of fish seed and using the Bag feeding method for polyculture species.	Field work	BL4-Analyze	20

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Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO4	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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Syllabus-2023-2024

(SOAG)(BSc_HonsAgriculture)

Title of the Course	Processing, Preservation and Value Addition in OMA Plants
Course Code	ELP-HORT-408 [P]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					0	0	10	10
Course Type	Lab only							
Course Category	Discipline Electives							
Pre-Requisite/s	Fundamentals of Horticulture		**Co-Requisite/s**	Post-harvest and value addition of fruits and vegetable				
Course Outcomes & Bloom's Level	**CO1-** Comprehends various processing techniques applicable to ornamental medicinal and aromatic plants.**(BL1-Remember)** **CO2-** Acquire proficiency in preservation methods enabling effective quality assurance and extended shelf life.**(BL2-Understand)** **CO3-** Apply value addition strategies enabling to capitalize on the diverse applications and market opportunities.**(BL3-Apply)** **CO4-** Develop competence in accessing the quality of processed and preserved products**(BL4-Analyze)** **CO5-** Analyze market dynamics with respect to consumer preference.**(BL5-Evaluate)** **CO6-** Creation of preserve, processed and value-added products sustainably**(BL6-Create)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✓ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕	**SDG (Goals)**	SDG2(Zero hunger) SDG3(Good health and well-being) SDG4(Quality education) SDG8(Decent work and economic growth) SDG9(Industry Innovation and Infrastructure) SDG12(Responsible consuption and production) SDG13(Climate action) SDG15(Life on land)					

Part B

Modules	**Contents**	**Pedagogy**	**Hours**

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Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Module-1	Effect of Drying Methods on Aromatic Plant Quality Compare the impact of air-drying, oven-drying, and freeze-drying on the aroma, color, and chemical composition of aromatic plants like lavender or mint.	Experiments	BL2-Understand	20
Module-2	Preservation Techniques for Ornamental Plants Investigate the efficacy of different preservation methods (such as drying, glycerine preservation, and silica gel drying) on maintaining the color and texture of ornamental plants like roses or orchids.	Experiments	BL2-Understand	20
Module-3	Biochemical Analysis of Medicinal Plant Extracts Analyze the biochemical composition of extracts from medicinal plants like ginseng or echinacea using techniques like chromatography and spectrophotometry to determine their medicinal value.	Experiments	BL3-Apply	20
Module-4	Comparative Study of Preservation Methods for Aromatic Herbs Compare traditional preservation methods (e.g., drying, salt curing) with modern techniques (e.g., vacuum sealing, freeze-drying) to determine their impact on the aroma and flavor retention of herbs like basil or thyme.	Experiments	BL3-Apply	20
Module-5	Enhancing Medicinal Plant Properties through Fermentation Study the effects of fermentation on the bioactivity and bioavailability of compounds in medicinal plants such as garlic or aloe vera, exploring changes in chemical composition and potential health benefits.	Experiments	BL4-Analyze	20
Module-6	Value Addition through Herbal Tea Blending Experiment with blending different dried aromatic and medicinal herbs to create unique herbal tea blends, assessing their sensory qualities and potential health benefits through taste tests and chemical analysis.	Experiments	BL4-Analyze	20
Module-7	Preservation Techniques for Fresh-cut Ornamental Flowers Investigate the effectiveness of preservatives, hydration solutions, and storage conditions in prolonging the vase life of fresh-cut ornamental flowers like roses or carnations	Experiments	BL5-Evaluate	20
Module-8	Assessment of Antioxidant Activity in Aromatic Plants Measure the antioxidant activity of aromatic plants such as sage or oregano using assays like DPPH radical scavenging or ORAC (oxygen radical absorbance capacity) to quantify their potential health benefits.	Experiments	BL5-Evaluate	20

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
100	41				

Part E

Books	Bose, T. K. and Chowdhury, B. 1991.Tropical Garden Plants in colour. Horticulture and allied publishers, 3D Madhab Chatterjee street Kolkata. K.V.Peter.2009.Ornamental plants. New India publishing agency, Pitampura, New Delhi.
Articles	
References Books	
MOOC Courses	
Videos	

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Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO4	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-
CO5	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-

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Syllabus-2023-2024

(SOAG)(MSc_Agriculture-Genetics_and_Plant_Breeding)

Title of the Course	Molecular Breeding and Bioinformatics
Course Code	GPB-506[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Fundamentals of Breeding		**Co-Requisite/s**	Basics of Biotechnology				
Course Outcomes & Bloom's Level	**CO1-** Study the structure and function of cell and cell cycle **(BL1-Remember)** **CO2-** Understand the principles of bioenergetics and the history of molecular genetics. **(BL2-Understand)** **CO3-** Examine the structure and function of genetic material and its regulation and Central Dogma of life **(BL3-Apply)** **CO4-** Mechanism of recombinant DNA technology and gene amplification. **(BL4-Analyze)** **CO5-** Conceptualize the mechanism of unregulated cell cycle (cancer ancell aging). **(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG2(Zero hunger) SDG8(Decent work and economic growth) SDG15(Life on land)				

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Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Ultrastructure of the cell; Differences between eukaryotic and prokaryotic cells, macromolecules; Structure and function of cell wall, nuclear membrane and plasma membrane; Cellular Organelles nucleus, plastidschloro/chromoplast, mitochondria endoplasmic reticulum, Golgi complex, lysosomes, peroxisomes.	T1 Class room teaching(chalk-board) Power Point Presentations T2 ABL activities Assignments Flip Class/ Seminars Quiz	6
Unit 2	Bioenergetics; Ultra structure and function of mitochondria and biological membranes; Chloroplast and other photosynthetic organelles; Interphase nucleus- Structure and chemical composition; Cell division and physiology of cell division.	T1 Class room teaching(chalk-board) Power Point Presentations T2 ABL activities Assignments Flip Class/ Seminars Quiz	6
Unit 3	Historical background of molecular genetics; Genetic material in organisms; Structure and properties of nucleic acid, DNA transcription and its regulation Transcription factors and their role; Genetic code, regulation of protein synthesis in prokaryotes and eukaryotes ribosomes, t-RNAs and translational factors.	T1 Class room teaching(chalk-board) Power Point Presentations T2 ABL activities Assignments Flip Class/ Seminars Quiz	6
Unit 4	Transposable elements; Mechanisms of recombination in prokaryote; DNA organization in eukaryotic chromosomes DNA content variation, types of DNA sequences Unique and repetitive sequences; organelle genomes; Gene amplification and its significance; Proteomics and protein-protein interaction; Signal transduction; Genes in development; Cancer and cell aging.	T1 Class room teaching(chalk-board) Power Point Presentations T2 ABL activities Assignments Flip Class/ Seminars Quiz	8

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Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical 1	Morphological and Gram staining of natural bacteria.	Experiments	BL2-Understand	2
Practical 2	Cultivation of bacteria in synthetic medium.	Experiments	BL2-Understand	2
Practical 3	Determination of growth rate and doubling time of bacterial cells in culture.	Experiments	BL3-Apply	2
Practical 4	Demonstration of bacteriophage by plaque assay method.	Experiments	BL3-Apply	2
Practical 5	Determination of soluble protein content in a bacterial culture.	Experiments	BL3-Apply	2
Practical 6	Isolation, purification and raising clonal population of a bacterium.	Experiments	BL4-Analyze	2
Practical 7	Biological assay of bacteriophage and determination of phage population in lysate	Experiments	BL5-Evaluate	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

Part E

Books	Bruce, A. (2004). Essential Cell Biology. Garland. Karp, G. (2004). Cell and Molecular Biology: Concepts and Experiments. John Wiley. Klug, W.S. & Cummings, M.R. (2003). Concepts of Genetics. Scot, Foreman &Co. Lewin, B. (2008). IX Genes. John Wiley & Sons Lodish, H, Berk, A. & Zipursky, S.L. (2004). Molecular Cell Biology. 5th Ed. WH Freeman. Nelson, D.L. & Cox, M.M. (2005). Principles of Biochemistry. WH Freeman & Co. Russell, P.J. (1996). Essential Genetics. Blackwell Scientific Publ. Schleif, R. (1986). Genetics and Molecular Biology. Addison-Wesley Publ. Co.
Articles	
References Books	
MOOC Courses	
Videos	

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Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	3	-	-	-	-	-	-	1	-	-	-	-	3	-	-
CO2	-	-	1	-	-	-	-	-	-	-	-	-	1	3	-
CO3	-	2	-	-	-	-	2	-	-	-	-	-	-	-	2
CO4	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-
CO5	-	-	1	-	-	-	1	2	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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CELEBRATING DREAMS

Syllabus-2023-2024

(SOAG)(MSc_Agriculture-Genetics_and_Plant_Breeding)

Title of the Course	Seed Developmental Biology
Course Code	SST-501[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					1	0	1	2
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Seed Technology		**Co-Requisite/s**	Basics of Botany				
Course Outcomes & Bloom's Level	**CO1-** Define the fundamental concepts of reproduction in flowering plants.**(BL2-Understand)** **CO2-** Understanding on fundamental aspects of gametogenesis.**(BL2-Understand)** **CO3-** Conceptualize the advanced research on seed developmental biology**(BL4-Analyze)** **CO4-** Examine the process of Seed maturity indices.**(BL1-Remember)** **CO5-** Application of plant hormones and novel signaling molecules to understand the process of germination and to determine signal transduction mechanisms in seeds.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✕ Entrepreneurship ✕ Employability ✕ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG11(Sustainable cities and economies) SDG12(Responsible consuption and production)				

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Part B

Modules	Contents	Pedagogy	Hours
Unit 1	Floral types, structure and biology in relation to pollination mechanisms; sporogenesis: microsporogenesis and megasporogenesis; gametogenesis - development of male and female gametes and their structures; effect of environmental factors on floral biology.	Activity based learning using different tools, Flipped classes teaching model, Collaborative learningField demonstration of cultivation practices, Assignment, Unannounced test	3
Unit 2	Fertilization – embryo sac structure, process, barriers to fertilization, incompatibility and male sterility, factors affecting fertilization	Activity based learning using different tools, Flipped classes teaching model, Collaborative learningField demonstration of cultivation practices, Assignment, Unannounced test	3
Unit 3	Embryogenesis - development of typical monocot and dicot embryos; endosperm development, modification of food storage structures with reference to crop plants; different types of embryos, endosperm and cotyledons; development and their structure in representative crop plants with reference to food storage.	Activity based learning using different tools, Flipped classes teaching model, Collaborative learningField demonstration of cultivation practices, Assignment, Unannounced test	3
Unit 4	External and internal features of monocot and dicot seed; seed coat structure and development in representative crop plants.	Activity based learning using different tools, Flipped classes teaching model, Collaborative learningField demonstration of cultivation practices, Assignment, Unannounced test	3
Unit 5	Apomixis – identification, classification, significance and its utilization in different crops for hybrid seed production; Polyembryony - types and significance; haplontic and diplontic sterility, causes of embryo abortion, embryo rescue and synthetic seeds.	Activity based learning using different tools, Flipped classes teaching model, Collaborative learningField demonstration of cultivation practices, Assignment, Unannounced test	4

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Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical-1	Study on floral biology of monocot, Study on floral biology of dicot plants.	Field work	BL5-Evaluate	2
Practical-2	Study on pollen morphology of different crop, Pollen germination and viability test in major crops	Virtual Labs	BL3-Apply	2
Practical-3	Seed embryo and endosperm development in monocots, Seed embryo and cotyledon development in dicots.	Experiments	BL2-Understand	2
Practical-4	Anatomy and morphology of seed coat during development, Hard seed coat development.	Experiments	BL2-Understand	2
Practical-5	Study on external and internal structures 10. Seed development and maturation in agricultural crops – physical and physiological changes	Case Study	BL2-Understand	2
Practical-6	Seed development and maturation in horticultural crops – physical and physiological changes, Study of biochemical changes during seed development and maturation in agricultural crops.	Case Study	BL2-Understand	2
Practical-7	Study of biochemical changes during seed development and maturation in horticultural crops, Study on physiological and harvestable maturity and maturity indices in different crops	Case Study	BL2-Understand	2
Practical-8	15. Study on acquisition of seed dormancy and germination at different stages of maturity. 16. Preparation of seed album and identification of seeds	Experiments	BL5-Evaluate	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

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Part E

Books	Seed Technology by Khare and Bhale
Articles	
References Books	
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	2	-	1	-	-	1	-	-	-	-	-	-	-	-	-
CO2	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CO3	-	-	2	-	-	2	1	-	-	-	-	-	-	-	-
CO4	1	-	-	-	-	1	2	-	-	-	-	-	-	-	-
CO5	1	-	-	-	-	1	-	-	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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CELEBRATING DREAMS

Syllabus-2023-2024

(SOAG)(MSc_Agriculture-Genetics_and_Plant_Breeding)

Title of the Course	Post Harvest Handeling and Storage of Seeds
Course Code	SST-508[T]

Part A

Year		**Semester**		**Credits**	L	T	P	C
					2	0	1	3
Course Type	Embedded theory and lab							
Course Category	Discipline Core							
Pre-Requisite/s	Seed Technology		**Co-Requisite/s**	Maintenance breeding				
Course Outcomes & Bloom's Level	**CO1-** Define the basic mechanism involved in seed processing. **(BL1-Remember)** **CO2-** Understanding on fundamental aspects of storage techniques and quality management practices.**(BL2-Understand)** **CO3-** Conceptualize the advanced research on seed developmental biology.**(BL3-Apply)** **CO4-** Examine the process of seed deterioration**(BL4-Analyze)** **CO5-** Acquire the skill on seed handling and storage methods on commercial basis.**(BL5-Evaluate)**							
Coures Elements	Skill Development ✓ Entrepreneurship ✕ Employability ✓ Professional Ethics ✕ Gender ✕ Human Values ✕ Environment ✕		**SDG (Goals)**	SDG8(Decent work and economic growth)				

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Part B

Modules	Contents	Pedagogy	Hours
Unit-1	Seed processing – objectives and principles; processing sequence – threshing, shelling, ginning, extraction methods; drying – principles and methods; seed cleaning, grading, upgrading – methods – machineries and equipment – scalper, pre-cleaner, cleaner cum grader, specific gravity separator, indented cylinder, disc separator, spiral separator, velvet separator, magnetic separator, electronic colour sorter – working principles and functions.	ABL, Field Base and outdoor learning, Project work	7
Unit-2	Online seed processing – elevators and conveyers – processing plant – specifications, design and layout; mechanical injury – causes and detection – management.	ABL, Field Base and outdoor learning, Project work	6
Unit-3	Seed treatment – methods – pre and mid storage seed treatments, seed treating formulations and equipments; packaging materials – types – bagging and labeling; seed blending – principle and methods.	ABL, Field Base and outdoor learning, Project work	6
Unit-4	Seed storage – purpose and importance – factors affecting storage, optimum condition for storage of different seeds; storage principles – Harrington's thumb rule – concepts and significance of moisture equilibrium – maintenance of safe seed moisture – physical, physiological, biochemical and molecular changes during seed storage – storage behavior of orthodox and recalcitrant seeds – prediction of viability – viability nomograph.	ABL, Field Base and outdoor learning, Project work	6
Unit-5	Methods of seed storage – modified atmospheric storage – ultra dry storage – vacuum storage – cryopreservation – germplasm storage – gene banks – NBPGR, IPGRI and National seed storage laboratory; seed storage godown – structure – maintenance – sanitation.	ABL, Field Base and outdoor learning, Project work	7

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Part C

Modules	Title	Indicative-ABCA/PBL/ Experiments/Field work/ Internships	Bloom's Level	Hours
Practical -1	Seed extraction – wet and dry methods.	Experiments	BL5-Evaluate	2
Practical -2	Seed processing sequence for different crops	Experiments	BL5-Evaluate	2
Practical -3	Design of processing plant – equipments – estimation of processing efficiency	Experiments	BL5-Evaluate	2
Practical -4	Seed drying methods – principle and methods	Experiments	BL5-Evaluate	2
Practical -5	Practicing seed grading – upgrading techniques	Experiments	BL5-Evaluate	2
Practical -6	Pre-storage seed treatments – protectants – antioxidants – halogens	Experiments	BL5-Evaluate	2
Practical -7	Practicing seed blending methods	Experiments	BL5-Evaluate	2
Practical -8	Seed storage godown – sanitation, fumigation – visit to seed storage godown and cold storage unit	Experiments	BL5-Evaluate	2

Part D(Marks Distribution)

Theory					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
80	31	50		30	
Practical					
Total Marks	**Minimum Passing Marks**	**External Evaluation**	**Min. External Evaluation**	**Internal Evaluation**	**Min. Internal Evaluation**
20	10				

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Part E

Books	1. Barton LV. 1961. Seed Preservation and Longevity, (Vol. 1). Leonard Hill, London. 2. Gregg BR, Law AG, Virdi SS and Balis JS. 1970. Seed Processing. Avion printers, New Delhi. 3. Gupta D. 2009. Seeds: their conservation principles and practices. Sathish serial publishing house. New Delhi.
Articles	
References Books	4. Justice OL and Bass LN. 1978. Principles and Practices of Seed Storage. Agriculture Hand Book No. 506, Castle House Publication Ltd., Washington. 5. Kulkarni GN. 2011. Principles of Seed Technology. Kalyani Publishers, New Delhi. 6. Maiti RK, Sarkar NC and Singh VP. 2006. Principles of Post Harvest Seed Physiology and Technology. Agrobios, Jodhpur, Rajasthan. 7. Padmavathi S, Prakash M, Ezhil Kumar S, Sathiyanarayanan G and Kamaraj A. 2012. A Text book of Seed Science and Technology, New India Publishing Agency, New Delhi. 8. Sen S and Ghosh N. 2010. Seed Science and Technology. Kalyani Publishers, New Delhi. 9. Singhal NC. 2010. Seed Science and Technology. Kalyani Publishers, New Delhi.
MOOC Courses	
Videos	

Course Articulation Matrix

COs	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO
CO1	2	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO2	1	-	2	-	-	-	1	-	-	-	-	-	-	-	-
CO3	-	2	-	-	-	-	1	-	-	-	-	-	-	-	-
CO4	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-
CO5	-	-	2	-	-	2	1	1	-	-	-	-	-	-	-
CO6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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