



# Veer Bahadur Singh Purvanchal University, Jaunpur U.P.

Template for designing the Syllabus of Pre-Ph.D. course work

As per NEP-2020 guidelines

With effective from academic session 2022-23

**Subject prerequisites:** To study the subject **Agronomy**

**Programme outcomes (POs):**

1. Advances in Crop Growth, Productivity: The student will be able to understand the **Concept of growth analysis:** LAI, CGR, RGR, NAR, LAR, LAD ; Disadvantages of using leaf area as a basis of growth expression ; Types of growth curves -sigmoid, linear, parabolic and asymptotic.
2. Stress Crop Production And Irrigation Management: With the help of this programme, students will be able to learn about crop physiology.

**Programme specific outcomes (PSOs):**

(Concerned BoS of the subject shall map the POs, PSOs and COs)

List of all papers of Pre-Ph.D. course work or Post graduate diploma in Research (PGDR)

Year	Sem	Course Code	Course Title	Theory/ Research	Credit	Max. Marks
7	XIII	D011301T	Advances in Crop Growth, Productivity and Weed Sciences	Theory	6	100 [25(CIE)+75(UE)]
		D011302T	Stress Crop Production And Irrigation Management	Theory	6	100 [25(CIE)+75(UE)]
		D011303T	Research Methodology, Research Publication Ethics and Computer Applications	Theory	4	100 [25(CIE)+75(UE)]
		D011304R	Research Project	Research	-	100 [25(CIE)+75(UE)]

**Credit system:**

- A four (4) credit theory course/paper will have four Lectures/periods (of one hour) in a week. In one full semester the course will be covered in 60 Lectures.
- Similarly, a Seven (7) credit theory course/paper will have six Lectures/periods (of one hour) in a week. In one full semester the course will be covered in 90 Lectures.

**Continuous Internal Evaluation (CIE) of 25 marks:**

- Continuous internal evaluation will be performed by the teacher/ course coordinator concerned.
- CIE shall be 25% of total assessment in a Theory paper and research project.



- 25 marks shall be distributed as 5 marks for attendance, 5 marks for presentation and assignment and remaining 15 marks for class test.

#### Marking system:

- All papers will have a total maximum mark of 100, including both CIE and University Examination (UE). Maximum marks of 25 will be allotted to CIE and 75 to UE in a theory paper/ research project.
- The CIE of the research project shall be evaluated by the research supervisor and co-supervisor (if any).
- 75 marks of **research project** shall be distributed as 50 marks (project work and presentation) and a viva voce of 25 marks.
- The evaluation (Max Marks 75 UE) of the research project shall be done by internal examiner/s (Supervisor and Co-supervisor (if any)) and one external examiner appointed by the University.

#### Research Project Submission:

- The evaluated research project report in two sets of hard copy (spiral binding) must be prepared. One copy of it shall be submitted to the university if it demands. A second copy of the evaluated research project report must be in the records of the college/research centre.
- The format of university Ph.D. thesis writing guidelines can be used as format of Research project writing guidelines.

<b>Programme:</b> Post graduate diploma in Research (PGDR)	<b>Year:</b> Seven (7)	<b>Semester:</b> XIII
<b>Subject: Agronomy</b>		
<b>Course Code:</b> <b>D011301T</b>	<b>Course Title:</b> ADVANCES IN CROP GROWTH, PRODUCTIVITY AND WEED SCIENCES	
<b>Course Outcomes ( COs)</b>		
<p><b>CO1:</b> To study the physiology of vegetative and reproductive growth in relation to productivity of different crops in various environments.</p> <p><b>CO2:</b> To teach about the changing weed flora,</p> <p><b>CO3:</b> To teach about the new herbicides, their resistance, toxicity, antidotes and residue management under different cropping systems.</p> <p><b>CO4:</b> To study the Mixed/inter cropping systems and related terminology, advantages and limitations;</p>		
<b>Credits:</b> 6	<b>Core Compulsory</b>	
<b>Max. Marks:</b> 25 (CIE) + 75(UE)	<b>Min. Passing marks:</b> 55	
<b>Total number of lectures:</b> Lectures-Tutorial-Practical (6 hours in a week) L-T-P: 6-0-0( <b>90 hr#</b> )		
<b>Unit</b>	<b>Topics</b>	<b>No. of Lecture Hrs.</b>

I	<p><b>Physiological limitations to crop yield:</b></p> <p>Leaf area , photosynthesis, dry matter distribution; Solar radiation-concept, agro- techniques for harvesting solar radiation for crop yield ; Cardinal points of vital activities-Schimper's optima, Hopkin's Bioclimatic law ; Physiology of germination and seedling emergence - series/steps of germination;</p>	15
II	<p><b>Concept of growth analysis:</b></p> <p>Merits and de-merits , LAI, CGR, RGR, NAR, LAR, LAD ; Disadvantages of using leaf area as a basis of growth expression ; Types of growth curves -sigmoid, linear, parabolic and asymptotic</p>	15
III	<p><b>Principles involved in mixed/inter cropping systems:</b></p> <p>Mixed/inter cropping systems and related terminology, advantages and limitations; Heat unit concept of crop maturity- remainder index, degree days, physiological index and interrelationship; Regulation of growth and development of field crops; Bioenergetics of metabolic process.</p>	15
IV	<p><b>Concept of Plant Ideotype</b></p> <p>Crop physiological and new ideotypes; characteristics of ideotype for wheat, rice, maize, etc.; concept and types of growth hormones; their role in field crop production; efficient use of resources.</p>	18
V	<p><b>Weed crop competition in different crop:</b></p> <p>Crop competition in different cropping situations, changes in weed flora, various causes and effects. Absorption, translocation and action of herbicides in plants.</p>	15
VI	<p><b>Fate of herbicides:</b></p> <p>Fate of herbicides in plants and soils and factors affecting them, selectivity of herbicides and factors affecting ;herbicide and environment interaction, residue management of herbicides, adjuvants, advances in herbicide application techniques, herbicide resistance and their remedial measures; Compatibility of herbicides with other pesticides, synergism and antagonism</p>	12

	in herbicides, development of transgenic herbicide resistant crops, relationship of herbicides with tillage, fertilizer and irrigation, bio-herbicide approach in weed management	
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**# One credit is equivalent to 15 lecture hours as per NEP norms in theory classes. Number of hours in each unit 15 hours may vary as per the content of the unit.**

**Suggested Readings:**

1. **D.J. Watson. 1952.** The physiological basis of variation in yield. Advances in Agronomy Vol.4 American Society of Agronomy. Academic Press . Inc. Publishers, New York USA
2. **R.W. Willey and S.B. Heath. 1969.** Quantitative relationship between plant population and crop yield Advances in Agronomy Vol.4 American Society of Agronomy. Academic Press . Inc. Publishers, New York USA
3. **L.T. Evans. 1975.** Crop Physiology, Cambridge University Press, London, U.K.
4. **K.H.W. Klages 1968.** Ecological crops geography. The Macmillan Co. New York, USA.
5. **C.P. Wilsie. 1962.** Crop Adaptation and Distribution, W.H. Freeman and Company, San Francisco and London.
6. **U.S.Gupta. 1979.** Physiological Aspects of Dryland Farming (Ed) Oxford and IBH Publishing Co.,New-Delhi.
7. **Scott Russel. 1982.** Plant Root Systems, Mc GrawHill Book Company, England.
8. **U.S. Gupta, 1988.** Progress in Crop Physiology. Oxford and IBH Publishing Co., New-Delhi.
9. **U.S. Gupta, (Ed.) 1995.** Production and Improvement of Crops for Drylands. Oxford & IBH, New  
a. Delhi
10. **R.W. Willey. 1979.** Intercropping –its importance and research needs Part-I . Field Crop Abstract,CAB,Publication , England, 32-1-9
11. **Z. Sastak, J. Catsky, and P.G. Jarwis. 1971.** Plant photosynthetic Production, Manual of Methods, W. Junk, N. V. Publication.
12. **S.C.Verma and M.P.Singh. 1987.** Agronomy of New Plant Types. Tara Book Company, Varanasi.
13. **R.M. Delvin and F.H. Witham. 1986.** Plant Physiology . CBS Publishers and Distributors, New-Delhi.
14. **G.Singh, J.S. Kolar and H.S. Sekhon 2002.** Recent advances in Agronomy. Indian Society of Agronomy, IARI, New-Delhi.
15. **P.J. Redford . 1967.** Growth Analysis Formulae : Their Use and Abuse, Crop Science 7:171-175.
16. **A.L. Lehninger. 2006 .**Biochemistry . Kalyani Publishers New -Delhi.
17. **B.N.Chatterjee and B.K. Mandal 1992.** Present Trends in Research on Intercropping .  
*Indian*  
a. *J.Agric.Sci.*62: 507-518.

18. **R.L.Yadav, Punjab Singh , R. Prasad and IPS Ahlawat 1998.** Fifty Years of Agronomy Research in India , Indian Society of Agronomy IARI , New-Delhi.
19. **Gupta O.P.2000.** Modern Weed Management, Agrobios Publishers. **Gupta O.P.2007.** Weed Management, Principles and Practices
20. **AgrobiosRao V.S. 2007.** Principles of Weed Science, Oxford & IBH
21. **Zimdahl RL. 1999.** Fundamentals of Weed Sciences 2<sup>nd</sup> Ed. Academic Press. Devine, Duke and Fedtke. 1988. Physiology of Herbicide action.
22. **U.S.Walia, 1990.** Weed management, Kalyani Publishers, New Delhi. Saraswat VN, Bhan VM & Yaduraju NT, 2003. Weed Management, ICAR.
23. **Streibig JC and Kudsk P. 1993.** Herbicide Bioassays, CRC Press Inc.
24. **Naylor REL. 2002.** Weed Management Blackwell Publishing Co.

Programme: Post graduate diploma in Research (PGDR)	Year: Seven (7)	Semester: XIII
<b>Subject: Agronomy</b>		
Course Code: <b>D011302T</b>	Course Title: STRESS CROP PRODUCTION AND IRRIGATION MANAGEMENT	
<b>Course Outcomes ( COs)</b>		
CO1: To study about the purpose of stress and Strain.		
CO2: To study about salt stress and its effect on plant growth.		
CO3: To study about environmental pollution.		
CO4: To study about Soil, Plant, Water relationship.		
CO5: To study about different management practices for improving water use efficiency of crops.		
CO6: To study about Irrigation management for efficient crop production.		
CO7: To study about Antitranspirants.		
CO8: To study about the principles of integrated water management.		
Credits: 6	Core Compulsory	
Max. Marks: 25 (CIE) + 75(UE)	Min. Passing marks: 55	
Total number of lectures: Lectures-Tutorial-Practical (6 hours in a week) L-T-P: 6-0-0		<b>(90 hr#)</b>
Unit	Topics	No. of Lecture Hrs.
I	<b>Stress and strain terminology:</b> Nature of stress injury and resistance; causes of stress; low temperature; viz., chilling and freezing injury and resistance; high temperature or heat stress injury and resistance; water stress viz; water deficit, excess water or flooding stresses injury and resistance.	<b>15</b>
II	<b>Salt stress and its effect on plant growth:</b> Stress injury and resistance; practical ways of overcoming various stresses through soil and crop manipulations;	<b>15</b>
III	<b>Environmental pollution:</b> Air, soil and water-body their effect on crop growth and quality.	<b>15</b>
IV	<b>Water resources of India:</b> Irrigation projects, irrigation needs, atmospheric, soil, agronomic, plant and water factors affecting irrigation need, water deficits and crop growth. Soil plant water relationships, transpiration and	<b>18</b>

	evapo-transpiration, significance of transpiration, energy utilization in transpiration, physiological processes and crop productivity. Infiltration, water movement under saturated and unsaturated conditions, management practices for improving water use efficiency of crops.	
V	<b>Irrigation System:</b> Application of irrigation water, conveyance and distribution system, irrigation efficiency, agronomic considerations in the design and operation of irrigation projects, characteristics of irrigation and farming systems affecting irrigation management. Strategies of using limited water supply, factors affecting ET, control of ET by mulching and use of antitranspirants. Fertilizer use in relation to irrigation, optimising the use of given irrigation supplies.	15
VI	<b>Integrated Water Management:</b> Land suitability for irrigation, land irrigability classification, integrated water management in command areas, institution of water management in commands, Farmer's participation in command areas, irrigation legislation.	12

# One credit is equivalent to 15 lecture hours as per NEP norms in theory classes. Number of hours in each unit 15 hours may vary as per the content of the unit.

#### Suggested Readings:

1. Baker FWG. 1989. *Drought Resistance in Cereals*. Oxon, UK.
2. Gupta U.S. (Ed.). 1988. *Physiological Aspects of Dryland Farming*. Oxford & IBH. Kramer PJ. 1983. *Water Relations of Plants*. Academic Press.
3. Levitt J. 1980. *Response of Plants to Environmental Stresses*. Vols. I, II. Academic Press. Mavi HS. 1994. *Introduction to Agro-meteorology*. Oxford & IBH.
4. Nilsen ET & Orcut DM. 1996. *Physiology of Plants under Stress – Abiotic Factors*. John Wiley & Sons.
5. Singh K. 2000. *Plant Productivity under Environmental Stress*. Agrobios.
6. Somani LL & Totawat KL. 1992. *Management of Salt-affected Soils and Waters*. Agrotech Publ.

7. Virmani SM, Katyal JC, Eswaran H & Abrol IP.1994. *Stressed Ecosystem and Sustainable Agriculture*. Oxford & IBH.
8. FAO. 1984. *Irrigation Practice and Water Management*. Oxford & IBH.
9. Michael AM. 1978. *Irrigation: Theory and Practice*. Vikas Publ.
10. Mishra RR & Ahmad M. 1987. *Manual on Irrigation Agronomy*. Oxford & IBH. Panda SC. 2003. *Principles and Practices of Water Management*. Agrobios.
11. Reddy SR. 2000. *Principles of Crop Production*. Kalyani.
12. Sankara Reddy GH & Yellamananda Reddy 1995. *Efficient Use of Irrigation Water*. In: Gupta US.(Ed.).
13. *Production and Improvement of Crops for Drylands*. Oxford & IBH.
14. Singh SS. 2006. *Principles and Practices of Agronomy*. In: Gupta US. (Ed.). *Production and Improvement of Crops for Drylands*. Oxford & IBH.
15. Majumdar, D.K. 2004. *Irrigation Water Management: Principles and Practice*. Prentice Hall of India, New Delhi

Programme: Post graduate diploma in Research (PGDR)	Year: Seven (7)	Semester: XIII
<b>Subject: Agronomy</b>		
Course Code: <b>D011303T</b>	Course Title: Research Methodology, Research Publication Ethics and Computer Applications	
<b>Course Outcomes ( COs)</b> <b>CO1:</b> With the help of this course, students will be able to decide the research field, topic, design, and pros and cons of research, sampling, and data collection techniques. <b>CO2:</b> The student will be able to understand the research process and acquire the skill of writing research articles. <b>CO3:</b> The course will enable you to execute the best practices, morals, and ethical values in scientific conduct and avoid publication misconduct. <b>CO4:</b> With the help of this course, students will be able to learn about the standards of journals for good-quality publications of their research work. <b>CO5:</b> After this course, the students will be able to learn how to use computers and different application software for manuscript writing. <b>CO6:</b> This course will enable the students to learn about reference management and the maintenance of academic integrity using scientific tools. They will be familiar with the protection of the machines from computer hazards.		
Credits: 4	Core Compulsory	
Max. Marks: 25 (CIE) + 75(UE)	Min. Passing marks: 55	



Total number of lectures: Lectures-Tutorial-Practical (4 hours in a week) L-T-P: 4-0-0		(60 hr)
Unit	Topics	No. of Lecture Hrs.
I	<b>Research Methodology</b> Definition, and Objectives, Motivation and Significance of Research, Types of Research, Truth and Facts of Research, Similarity and Contrast in Literary Research and Scientific Research, Research and Criticism, Research Problem and Research Design, Sampling Design and Methods of Data Collection.	12
II	<b>Research standards:</b> Layout of the Research Report, Research Process: subject Selection, Outline of the Research, Review of Literature, Material Collection; Testing and Classification, Analysis, Discussion and Conclusions, Precautions in Writing Synopsis/Research Paper/Thesis/Research Report.	12
III	<b>Philosophy, Ethics, Scientific Conducts and misconduct</b> Moral Philosophy, Nature of Moral Judgments and Reactions, Publication Ethics, Best Practices/Standards Setting Initiatives and Guidelines: Committee on Publication Ethics (COPE), World Association of Medical Editors (WAME) etc., Intellectual Honesty and Research Integrity: Falsification, Fabrication and Plagiarism (FFP), Open Access Publishing, and Publication Misconduct.	08
IV	<b>Databases and Research Metrics</b> Databases: Indexing Databases, Citation Databases: Web of Science, Scopus etc., Research Metrics: Impact Factor of Journal as Per Journal Citation Report, SNIP, SJR, IPP, Cite Score; Metrics: h-Index, g-Index, i-10 Index, and Altmetric.	08
V	<b>Fundamentals of Computers and application Softwares</b> Types Of Computers, Computer Peripherals and internal component, Types of Operating Systems, Web Browser, Web Search Engine, Spreadsheet Processing, Presentation (MS PowerPoints Preparation or Beamer or Libre Office (Optional), Project/Thesis/Report writing, Using MS-Word or LaTeX or LibreOffice documentation style Labelling, References Style, Footnotes etc.	12
VI	<b>Scientific Softwares</b> Use of Reference Management Software Like Mendeley, Zotero,	08

Reference Manager, Endnote, Authorea Etc. Anti-Plagiarism Software Like Turnitin, iAuthenticate, Urkund, Ebooks and Virtual Library, UGC-Infonet, Computer Hazards and Security
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### Suggested Readings:

1. C.R. Kothari, *Research methodology Methods and Techniques*, 4<sup>th</sup> Edition, New Age International (P) Ltd. Publisher, 2014.
2. W. Creswell, *Research Design, Qualitative, Quantitative and mixed method approaches*, 3rd Edition, Sage Publications, Inc.
3. D.B. Resnik, (2011) What is ethics in research & Why is it important. National institute of Environmental Health Science, 1-10 Retrieved from <https://www.niehs.nih.gov/research/resources/bioethics/whatis/index.cfm>
4. Indian National Science Academy (INSA), *Ethics in Science Education, Research and Governance* (2019), ISBN:978-81-939482-1-7. [https://www.insaindia.res.in/pdf/Ethics\\_Book.pdf](https://www.insaindia.res.in/pdf/Ethics_Book.pdf)
5. Reema Thareja (2019) *Fundamentals Of Computers* (2<sup>nd</sup> Edition), Oxford University Press
6. *Microsoft Office 365 : A complete Guide to Master Word, Excel, and PowerPoint 365 for Beginners*, Matt Vic
7. Leslie Lamport, *LaTeX, A Document Preparation System*, 2<sup>nd</sup> Edition, Addison-Wesley Professional Publisher, July, 1994.
8. Latex tutorials <https://www.tug.org/twg/mactex/tutorials/ltxprimer-1.0.pdf>
9. Libre Office tutorial: [www.documentation.libreoffice.org/en/english-documentation](http://www.documentation.libreoffice.org/en/english-documentation)


Suggested equivalent online courses: <https://epgp.inflibnet.ac.in/>

Programme: Post graduate diploma in Research (PGDR)	Year: Seven (7)	Semester: XIII
Subject: <b>Agronomy</b>		
Course Code: <b>D011304R</b>	Course Title: <b>Research Project /Thesis</b>	
Course Outcomes (COs) CO1:..... CO2:..... CO3:..... <b>Number of COs shall be decided by BoS</b>		
Credits: Non -Credit	Core Compulsory	
Max. Marks: 25 (CIE) + 75(UE)	Min. Passing marks: 55	

Suggested Readings: ( **To be suggested by Concerned BoS**)

Suggested equivalent online courses: ( **To be suggested by Concerned BoS**)

Further Suggestions: ( **To be suggested by Concerned BoS**)

  
20/9/22

Prof. Shrish Kumar Singh  
Convener  
of BOS Agronomy



Prof. Anil Kumar Singh  
Internal Expert  
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Prof. Ram Kumar Singh  
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Prof. S. P. Singh  
Internal Expert  
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