PROSPECTUS

FOR

CERTIFICATE COURSES UNDER RPCAU, PUSA

NODAL OFFICER

P.G. DIPLOMA & CERTIFICATE COURSES

DR. RAJENDRA PRASAD CENTRAL AGRICULTURAL UNIVERSITY

PUSA, SAMASTIPUR (BIHAR)

www.rpcau.ac.in

About the University

Dr. Rajendra Prasad Central Agriculture University (Earlier, Rajendra Agricultural University) was originally established as India's first-ever Imperial Agriculture Research Institute in 1905 with a vision of making it a nucleus of agricultural activities, research and education for the whole country and to attract the best of talents from India and abroad. The conversion of this University into Central Agricultural University was accomplished in 2016 for further generating and expanding the knowledge in the field of agriculture and allied sciences. The University is generating quality human resources and providing dynamic leadership in teaching, research, and extension related to agriculture and allied sciences and is strongly committed to serving the farming community of the country in general and Bihar state in particular justifying its status as the institute of the national importance.

Dr. Rajendra Prasad Central Agricultural University is an institution with vast green, residential campus having excellent accommodation and other basic amenities, spread over 1100 acres with rich biodiversity and committed to expanding the horizon of agricultural knowledge and transforming agriculture through education and innovative technologies by integration of teaching, research and extension activities to reinforce quality learning environment The University is marching ahead with mission to widen the knowledge base with many collaborative endeavours and imparting education to diverse students population from 27 states by creating exemplary academic ambiance, safe and secure environment, smart classrooms, the state of art library, updated laboratories, counselling and various career opportunities.

The University has the honour to find a place under universities of the country Recognized for Excellence Ranked 8 in Agriculture and Horticulture University Category by IIRF India University Rankings 2026 and NIRF ranked 14th in 2025.

INTRODUCTION

Certificate course on Artificial Insemination (AI) & Embryo Transfer Technology (ETT) will be **six months** course. It will be full time course which focuses on providing knowledge and hands on training to the students in the area of animal production, reproduction, artificial Insemination (AI), Embryo Transfer Technology (ETT), care and breeding management of domestic animals.

Land division (Shirring cultivated land), climate changes, unemployment, migration, crop residues burning, Malnutrition and water shortage are major challenges faced by farmers. Other hand, farmers (we) have some opportunities, i.e. temperature ranges 10-38 ^{0}C, huge amount of agro-wastes and higher density of population. Challenges may be deliberated in context of opportunities as follows: **Kheti Bina Khet ke** (Vertical Farming), short duration crop and crops under different temperature regime by mushroom production technology. Further the mushroom production technology can be addressed as follows: Mushroom spawn production, mushroom cultivation, mushroom compost production, processing & packaging. Value added products development and marketing.

In changing scenario, the national annual production of mushroom is approx 3 million and Bihar's production is 22500 ton which increased 10 times within 5 years. Such vast potentiality of mushroom production technologies may be empowering Indian farmers. Generally, 6 (six) mushroom genera are well known and widely cultivated in India they are *Pluerotus, Agaricus, Calocybe, Shiiatake, Hericioum* and *Volvariella*. All these mushrooms are widely cultivated one agro waste. After adoption of the technology farmer's income will increase manifold. Now there is lack of a technical person to handle the spawn production unit, Mushroom production unit which severely affect the industry.

Therefore, in the present certificate course moderately educated youth of the society can be trained and become skilled in Mushroom production technology for income and employment. This course focus on providing hands on capacity building of the students for the learning of Mushroom production technology. The candidates completing this course can be employed as technical assistant / technician or skilled manpower in aspects of mushroom production technology.

A. Duration of the Programme

i) 6 Months

ii) It is mandatory to complete the entire courses and project work to qualify for the certificate of the Programme.

B. Eligibility and Age Limit under different courses for different categories of students- Age as on last date of application will be taken for eligibility as detailed below.

S. No	Course Name	Eligibility	Age	Seats
1	Artificial Insemination & Embryo Transfer Technology	**12th Pass**	The candidate age should not exceed more than 30 years.	20 each
2	Mushroom Cultivation Technology			

The students must have obtained **minimum 50% marks** as in aggregate.

C. Selection Procedure:

i) Advertisement will be circulated through university website and also in newspaper for starting the certificate courses giving name of the courses, examination fees and no. of seats to each course. The details of selection procedure will be given on website with form regarding no. of seats under different categories, Age limit and age relaxation, Fees structure to different courses besides other relevant information and instructions. Intake to courses will be through common written competitive examination followed by viva, if satisfactory number of applications is received.

ii) Intake to courses will be through common written competitive examination followed by viva, if satisfactory number of applications is received.

iii). Questions will be from:

1. Reasoning - (30 Marks)
2. General Knowledge- (20 Marks)
3. General Science - (40 Marks)
4. Viva -(10 Marks)

Total - 100 Marks

D. Candidates merit list will be prepared separately as per given choice of courses, following Govt. of India Reservation policy.

E. Application Fees **Gen/OBC/EWS - Rs 500/-course and for SC/ST -Rs 250/-course.**

F. Age Relaxation will be given as per government norms – 5 Yrs for SC/ST and 3 Years for OBC.

G. Government of India reservation Policy as below will be followed during admissions.

Category	% of Reservation	Seat matrix
OBC (NCL- Non-Creamy Layer, whose family annual income is less than Rs.6 lakh)	27%	5
SC	15%	3
ST	7.5%	2
EWS	10%	2

Selection of Pwd candidate as per GOI Policy

H. University reserves the right to increase/decrease the no. of seats in the courses.

I. Courses for current academic session-2026 (Monsoon session) & Probable location for the conduct of courses

S.No	Course Name	Expert from University	Probable location
1	Artificial Insemination & Embryo Transfer Technology	Dr. Krishna Mohan Kumar, Associate Professor & Course Advisor/Nodal Officer (Animal Reproductive Physiology)	Centre of Excellence on Indigeous Breed (CoEIB), Piprakothi, Motihari
2	Mushroom Cultivation Technology	Dr. R.P. Prasad, In-charge, ACMR, RPCAU, Pusa	ADVANCE CENTRE OF MUSHROOM RESEARCH, RPCAU, Pusa

J. Courses & Credit hours of certificate courses

Courses	Credit Hrs
Artificial Insemination & Embryo Transfer Technology	40 (Theory (40%) & Practical (60%)
Mushroom Cultivation Technology	20

K. Grading System

a) The grading system will be on a 10-point scale.

b) The pass marks of a subject will be 50% (5.0 on 10-point scale).

c) A student graduating from this university must have an overall 55% marks (5.5 on 10 points scale).

d) A student will have to reappear in the subsequent examination of the subject if he/she fails after getting himself/ herself registered in that course.

L. The details of courses have been annexed as annexure 1 and 2.

M. Fees Structure:

The details of fee to be deposited by the students of Certificate Courses for the year 2026 (Six months) at the time of their admission, is given below: -

Fee Structure for Certificate Courses for the Year 2026 (Six months)

S. No.	Details of fee structure	Amount (Rs.)
1	Registration Fee	210.00
2	Admission Fee	260.00
3	Tuition Fee	15370.00
4	Exam Fee	500.00
5	Library Fee	330.00
6	Medical Fee	250.00
7	Athletic Fee	250.00
8	Extra Co-Curricular Fee	250.00
9	Common Room Fund	100.00
10	Hostel Fund	100.00
11	Seat Rent	2000.00
	Sub-Total (A)	**19620.00**
12	Laboratory Caution Money	660.00
13	Library Security Money	1650.00
14	Hostel Security Money	825.00
	Sub-Total (B)	**3135.00**
15	Development Fee	5000.00
16	University Registration Charge	165.00
17	PDC + Transcript	100.00
18	ODC (postal charge include)	800.00
19	Migration fee	250.00
	Sub-Total (C)	**6315.00**
20	Health Insurance	910.00
21	NSS	20.00
	Sub-Total (D)	**930.00**
	TOTAL (A+B+C+D)	**30000.00**
Rupees Thirty thousand only.		

The fee will be deposited to the Registrar, Certificate Courses, **Punjab National Bank Account No. 4512002100003422, Branch Pusa Farm, IFSC Code: PUNB0451200.**

CERTIFICATE COURSE

On

Artificial Insemination

& Embryo Transfer Technology

Centre of Excellence on Indigeous Breed (CoEIB), Piprakothi, Motihari

Dr. RAJENDRA PRASAD CENTRAL AGRICULTURAL UNIVERSITY, PUSA (SAMASTIPUR) BIHAR

Credit hour's distributions:

Credit hour means the weekly unit of work reorganization for particular course as per the Syllabus. A theory lecture class of one hour per week shall be counted as one credit hour where as a practical class of two or three-hours durations per week shall be counted as one credit hour.

List of courses offered:

Course No	Course Code	Course Title	Credit Hrs
1	AEA-101	Fundamental of A.I & ETT its history and scope	3 (3+0)
2.	AEA-102	Basic anatomy of domestic animal Reproductive organs	3 (3+0)
3.	AEA-103	Basic Animal Reproductive Physiology	3 (3+0)
4.	AEA-104	Introduction to AI and ETT Laboratory techniques and equipment's	4 (2+2)
5.	AEA-105	Hands on training on AI, Pregnancy Diagnosis and ETT procedure	3 (0+3)
6.	AEA-106	Basics of livestock feeding management & preventive health care	4 (3+1)
7.	AEA-107	Principles of semen collection, preservation and evaluation of semen samples	4 (2+2)
8.	AEA-108	Hands on training for advanced Laboratory techniques for ETT and embryo preservation.	2 (0+2)
9.	VLA- 201	Village, laboratory & Veterinary Hospital attachment	14 (0+14)

DETAILED SYLLABUS

1. Course No. 1: Fundamental of A.I & ETT and its history and scope - (AEA-101) Credit - (3+ 0)

Theory

Introduction to Artificial Insemination (AI) and Embryo Transfer Technology (ETT). Benefits and limitations of AI and ETT. Natural service vs AI and its limitations in livestock. Benefits of cross breeding and genetic improvement of dairy animals. Role of AI in genetic upgradation across states of India. AI vs ETT its advantages and limitations. Fundamental and basic concept of AI and ETT. History of artificial insemination in domestic animals. History of Embryo Transfer Technology. Scope of AI and ETT for upgradation and conservation of breeds of domestic animals. Major breakthrough achieved in AI and ETT. Role of AI and ETT technician towards the society.

Practical: NIL

2. Course No. 2: Basic anatomy of domestic animal and its reproductive organs - (AEA -102) Credit - (3+ 0)

Theory

Anatomy of external and internal body parts of dairy animals and their functions. Anatomy of male and female reproductive organ and their functions. Osteology of hind quarters of animals related with position of reproduction organs.

Practical: NIL

3. Course No. 3: Basic Animal Reproductive Physiology - (AEA -103) Credit - (3+ 0)

Theory

Common terms used to understand the reproductive physiology in domestic animals. Basic concept of estrus cycle in domestic animals. Different phases of estrus cycle in animals. Different estrus behavioral signs in animals during estrus period. Basic concept of endocrine control through hormone in reproduction in animals. Hormonal interventions to control reproduction and its limitations.

Practical: NIL

4. Course No. 4: Introduction to AI and ETT laboratory techniques & Equipment's - (AEA -104) Credit - (2+ 2)

Theory: Introduction to Embryo Transfer Technology (ETT) in domestic animals. Advantages and limitations of ETT. Selection of donor and recipient animals for embryo transfer. Synchronization of estrus in donor and recipient animals. Superovulation using hormonal therapy in ETT. Flushing, collection and evaluation of embryos.

Practical:

Introduction of the list of equipment and accessories used in the process of Artificial Insemination (AI) and ETT. Handling and maintenance of equipment used in AI and ETT. Basic concept of Standard Operating Procedure (SOP) followed during and after AI and ETT procedure. Handling of Liquid Nitrogen (LN2) container during process of AI. Importance of maintaining cold chain and liquid Nitrogen refilling schedule. LN2 conservation measures. Proper method of semen withdrawal from LN2 container, thawing, preparation of AI gun and proper site of semen deposition in female reproductive tract.

5. Course No. 5: Hands on training on AI, Pregnancy Diagnosis and ETT procedure - (AEA -105) Credit - (0+ 3)

Theory: NIL

Practical:
Identification of different female reproductive organs on morbid genitalia. Palpation of female genitalia in phantom box and passing AI gun. Structure of LN2 container and checking of LN2 level in the container. **Rectal palpation of female genitalia in live animals.** Passing of AI gun in live animals. Hands on training of proper method for withdrawal of straw from the container, thawing, preparation of gun, site of deposition of semen in female genitalia. Early pregnancy diagnosis through rectal palpation at 60 days and beyond. Introduction to ultrasonography for early pregnancy diagnosis.

6. Course No. 6: Basics of livestock feeding management & preventive health care - (AEA -106) Credit - (3+ 1)

Theory:
Basic aspect of nutrition and concept of ration balancing. Importance of proper nutrition including feeding of vitamins and mineral mixture. Deworming in fertility management with emphasis on adverse impact of micro and macro nutrient deficiency on fertility and reproductive health of animals. Proper balanced ration for dry, pregnant and lactating animals according to milk production. Basic knowledge of economically important diseases and their prevention through timely vaccination. Information of recent commercially available vaccine, vaccination schedule, and importance of cold chain for successful vaccination. Process of insurance of animals. First aid treatment in case of emergency and outbreak of disease. Process of timely reporting of animal disease outbreak to the government authorities.

Practical: Identification of different feed and fodder, practical demonstration of making balanced ration for dry, pregnant and lactating animals. Demonstration of vaccination procedure, route and handling of vaccine under field condition.

7. Course No. 7: Principles of semen collection, preservation and evaluation of semen samples - (AEA-107) Credit - (2+ 2)

Theory:
Basic process of semen collection from bull through artificial vagina. Evaluation of semen quality. Processing of semen for preservation. Different type of semen packing, structure of mini and medium straw along with information printed on straws and its importance. Breed wise semen straw colour codes. Diluent used for semen cryopreservation. Morphology of sperm/ spermatozoa.

Practical:
Introduction to microscope and its parts. Types of microscope and basic techniques in handling the microscope. Evaluation of different parameters of semen samples using microscope. Dilution of semen samples to get desired concentration of spermatozoa for artificial insemination and cryopreservation.

8. Course No. 8: Hands on training for advanced Laboratory techniques for ETT and embryo preservation. - (AEA-108) Credit - (0+ 2)

Theory: NIL

Practical:
Importance of biosecurity measures to be adopted during ETT and AI. Standard operating procedure (SOP) to follow during and after the ETT process. Preparation of animals for ETT, process of epidural anesthesia and securing the animals in modern Travis. Palpation and scanning of female reproductive organ using ultrasonography. Evaluation and grading of embryos for transfer and preservation.

9. Course No. 9: Village, laboratory & Veterinary Hospital attachment- (VLA-201)
Credit – (0+14)

Theory: NIL

Practical: The village and laboratory attachment where the candidate will be given exposure to the practical farm visit at farmer's door steps and commercial establishment of animal husbandry practices.

Evaluation/Examination:

- **Theory exam:** Written examination by giving question papers from syllabus of the theory sessions
- **Practical exam:** Hands on tests to assess practical skill in the laboratory and at the farm with animals.
- **Assignments: Assignment on t**opic related to theory and practical syllabus
- **Final project:** A comprehensive project related to village and field experience and their case analysis with a detailed report.

Resource and materials:

- Textbooks on artificial insemination, animal reproduction and production.
- Access to advanced well-equipped IVF-OPU laboratory established at CoEIB, RGM, Piprakothi and animal farm for practical sessions.
- Online resources of recent development in area of animal husbandry.

Instructors/ teaching faculties & Resource persons for the course:

1. **Dr. Krishna Mohan Kumar, Associate Professor** & **Course Advisor/Nodal Officer** (Animal Reproductive Physiology)
2. Dr. Pramod Kumar, Assistant Professor – (Animal Nutrition)
3. Dr. Ranjan Kumar, Associate Professor- (Animal Nutrition)
4. Dr. R. K. Asthana, Assistant Professor – (Vety. Obstetrics and Gynaecology)
5. Scientists of APRI, RPCAU, Pusa
6. T.V.O of Govt. Hospital as a resource person

(Prepared and submitted by Dr. Krishna Mohan Kumar, Associate Professor & course advisor, CoEIB, RPCAU, Pusa)

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ADVANCE CENTRE OF MUSHROOM RESEARCH
DR. RAJENDRA PRASAD CENTRAL AGRICULTURAL UNIVERSITY
PUSA, SAMASTIPUR, BIHAR-848125

CERTIFICATE COURSE

ON

MUSHROOM CULTIVATION TECHNOLOGY

MILKY MUSHROOM

BUTTON MUSHROOM

OYSTER MUSHROOM

TEAM OF SCIENTIST

1. Dr. R.P. Prasad
2. Dr. Sudha Nandni
3. Dr. Ranjeet Kumar
4. Dr. Sanjeet Kr. Sameer
5. Dr. Dayaram

For enquiry contact-

Dr. R.P. Prasad - 9801162379

In-charge,

ACMR, RPCAU, Pusa

CERTIFICATE COURSE

ON

MUSHROOM CULTIVATION TECHNOLOGY

(SIX MONTHS)

SYLLABUS

ADVANCE CENTRE OF MUSHROOM RESEARCH

DR. RAJENDRA PRASAD CENTRAL AGRICULTURAL UNIVERSITY

PUSA, SAMASTIPUR, BIHAR-848125

OBJECTIVES:

- To create skilled human resource in villages and town to support Mushroom entrepreneurs.
- Enabling rural youth providing services establishing Mushroom Spawn, Mushroom compost, Mushroom, processing and Mushroom products.
- To create income and employment opportunity among youth through Mushroom production technology.
- The candidates, after completion the course will have job opportunity in Mushroom industry or establish their own industry for income & employment.
- To understand edible and poisonous mushroom types.
- To learn cultivation and production of different edible mushrooms.
- To apply designing and construction of mushroom farms.
- To build Knowledge on disease and pests of mushroom and their management.
- To providing detailed hands-on training on mushroom cultivation, packaging and marketing.

OUTCOMES:

- ✓ Identify and classify common edible and poisonous mushrooms.
- ✓ Understand and apply techniques for growing various edible mushrooms.
- ✓ Design and build effective mushroom farming facilities.
- ✓ Assess the effectiveness of various treatment options and preventive measures for maintaining healthy mushroom crops.
- ✓ Develop marketing strategies and business plans for mushroom products, including branding, distribution, and market analysis.

ADVANCE CENTRE OF MUSHROOM RESEARCH
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Six (06) months certificate course on Mushroom Cultivation Technology (MCT)

Sl. No.	Course Number	Course Title	Credit Hrs
1.	MCT-101	Introductory Mushroom Cultivation Technology	3 (2+1)
2.	MCT-102	Cultivation Technology of Different Mushroom	3 (2+1)
3.	MCT-103	Mushroom Laboratory Techniques	2 (0+2)
4.	MCT-104	Mushroom Disease Pest and conterminals	2 (1+1)
5.	MCT-105	Spawn Production Technology	3 (2+1)
6.	MCT-106	Processing, Packaging Post Harvest and Product Development Management	3 (2+1)
7.	MCT-107	Spent Management	2 (1+1)
8.	MCT-108	Mushroom economics and marketing	2 (1+1)

DETAILED SYLLABI (Semester - I)

1. **MCT-101:- Introductory Mushroom Cultivation Technology: 3 (2+1)**

Theory :- Definitions mushroom, substrates, Compost, Mushroom production, Edible, Non-edible mushrooms poisons and Medicinal mushroom, Spawn, Mother spawn, Culture, Sources of information, Production, Protection management of different mushrooms Oyster, Button, Milky, Paddy Straw, Shiitake, Hericium, Maitake mushroom etc. Cultivation technology Auriculatria etc.

Nutritional and medicinal importance of mushroom, seasonal mushroom cultivation, Disease, Pest and contaminants and their control, organic mushroom production, marketing, components of mushroom production (Spawn production, compost production, mushroom cultivation product production, mushroom cultivation the production development and marketing.

Practical :- Cultivation of all Edible mushroom and Crop management.

2. **MCT-102:- Cultivation Technology of Different Mushroom 3 (2+1)**

Theory :- Compost production of different mushrooms (i.e. Oyster, Button, Milky, Paddy Straw, Shiitake, Hericium and other mushroom). Cultivation and management of Oyster, Button, Milky, Paddy Straw, Shiitake, Hericium and other mushroom compost production of Button mushroom i.e. long method of composting, short method of composting (Pasteurization tunnel method), Pipe method (ZEPT method), casing and casing material for button, oyster and king oyster. **Practical :-** Different method of compost production for button mushroom. Substrate preparation for Oyster, Button, Milky, Paddy Straw, Shiitake, Hericium and other mushroom. Substrate pasteurization of different mushroom substrate (Chemical, hot water treatment and by sterilizer), different mushroom crop management, casing and casing material preparation of mushroom for Button and King button mushroom.

3. MCT-103:- Mushroom Laboratory Techniques 2 (0+2)

Theory :- Different media for mushrooms, culture media preparation, culture, mother culture, contaminations, isolation of mushroom culture from tissue sub culture, sterilization of glass ware & media. Autoclaving substrate pasteurization, handling of different equipment etc.

Practical :- Media preparation, Culture of different Mushroom maintains spawn production handling of different equipment.

4. MCT-104:- Mushroom Disease Pest and contaminants 2 (1+1)

Theory :- Different insect, nematode infection and their management, different mould and their management diseases and their management crop management. Sterilization of mushroom farm.

5. MCT-105:- Spawn Production Technology 3 (2+1)

Theory :- Spawn of oyster, button, milky, paddy straw and spawn of medicinal mushroom production grain based spawn, substrate based spawn sawdust based spawn liquid spawn production method.

Practical :- Preparation of Spawn button, milky, paddy straw and spawn of medicinal mushroom.

6. MCT-106:- Processing, Packaging, Post Harvest and Product Development Management 3 (2+1)

Theory :- Dehydration, canning, powder making pickling blanching, packing etc.
Harvesting packaging of different mushroom transportation (long distance/short distance) and marketing of different mushroom, Enhance the self life pickling. Different recipe preparation (different types of sabji) sweet dish preparation, dehydration earning.

Practical :- Dehydration, canning, powder making pickling blanching, packing etc.
Product ready to eat and ready to cook preparation i.e. Mushroom Pakauda, Cutlet, Chopp, Kofta, Kawab, Rawa (Halua) Khajoor, Gujhia sos chatni etc. Sweets Gulab Jamun, Peda, Barfee, Laddu Khaja, Chhips, Badi, Biscuits, Namkeen Bhujiya etc.

7. MCT-107:- Spent Management 2 (1+1)

Theory :- Mushroom spent (Oyster, Milky, Shiitake, Hericium etc) utilization for decorating material, packing material, building material (seat, cloth) making, used as quality compost production, animal feed. Button spent used as compost/fertilizer for different crops.

Practical :- Field application of different crops.

8. MCT-108:- Mushroom economics and marketing 2 (1+1)

Theory :- Mushroom farm design, control unit, Principles of mushroom marketing cost benefit ratio of different mushroom, profit and loss

Practical :- Survey of local market, Visit of different mushroom farm and calculation of their C:B ration.