COLLEGE OF AGRICULTURAL ENGINEERING AND TECHNOLOGY, PARBHANI

History and Development of the Institution

Agricultural engineering is the engineering discipline that applies engineering science and technology to agricultural production and processing. Agricultural engineering combines the disciplines of animal biology, plant biology, and mechanical, civil, electrical and chemical engineering principles with knowledge of agricultural principles.

The first curriculum in Agricultural Engineering was established at Iowa State University by Professor J. B. Davidson in 1905. The American Society of Agricultural Engineers, now known as the American Society of Agricultural and Biological Engineers, was founded in 1907.Agricultural engineering has led to mono-cultural farming, paying specialized attention to one type of crop.

Agricultural engineers may perform tasks as planning, supervising and managing the dairy effluent schemes, irrigation, drainage, flood and water control systems, performing environmental impact assessments, agricultural product processing and interpret research results and implement relevant practices. A large percentage of agricultural engineers work in academia or for government agencies such as the Indian agricultural extension services. Some are consultants, employed by private engineering firms, while others work in industry, for manufacturers of agricultural machinery, equipment, processing technology, and structures for housing livestock and storing crops. Agricultural engineers work in production, sales, management, research and development, or applied science.

Agricultural Engineering education was genesis in India during the academic year 1942-43 at Allahabad Agricultural Institute, Allahabad. Subsequently B.Tech. (hons) programme was genesis at the Indian Institute of Technology, Kharagpur and then at the State Agricultural Universities in the sixties.

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The Government decided to establish an Agricultural University at Parbhani as it is centrally located in Marathwada, for the development of agriculture in Marathwada region. Marathwada Agricultural University was established on 18th May 1972; very recently the nomenclature is expanded as Vasantrao Naik Marathwada Krishi Vidyapeeth. Considering the basic needs of agriculture, the University started various levels of higher education (UG, PG, Ph.D) in Agriculture, Food Technology, Agricultural Engineering, Agricultural Engineering and Horticulture, Agricultural Business management, Biotechnology and so on. Maharashtra State has four Agricultural Universities. Out of the four VNMKV is privileged to have the College of Agricultural Engineering and Technology as one of the constituent Colleges working for the empowerment of farmers and students.

- **Growth of Institution**

The College of Agricultural Engineering, Vasantrao Naik Marathwada Krishi Vidyapeeth, Parbhani was established on 23rd November, 1986. Agricultural Engineering plays a vital role in increasing agricultural production and productivity. The college has contributed significantly in farm mechanization, land and water management, farm structure and green house technology, processing, storage and marketing of produce. The future prospectus for Agricultural Engineer lies in making effective contribution to the development of Agricultural and Agro industries system. Hence with the prime objective of development of Agricultural Engineering research and education programme, the college was established.

Agriculture Engineering involves the application of different fields of engineering related to watershed management, efficient use of irrigation water, soil conservation, solar energy, agricultural processing and preservation and handling of agricultural produce.

At this college, a four year rigorous practical oriented and inter-disciplinary programme after XIIth standard is offered leading to the B. Tech. (Agril. Engg.) degree. Degree programme is of four year duration spread over eight semesters. The B. Tech. (Agril. Engg.) degree programme unique of its kind, envisages the development, planning, implementation and evaluation of modern agricultural technologies for the upliftment, tradition bound agrarian rural society as well as for boosting the industrial revolution in the field of agro-based industries. In consonance with these multifaceted objectives, the courses are developed and taught covering various aspects of engineering and technology applied to the field of agriculture.

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During last 25 years twenty one batches have graduated from this college and more than 80 per cent of graduates got employment in different irrigation companies, seed processing plants, watershed development programme, irrigation projects, Banks, Government organizations. Farm implements manufacturing companies and agro based industries etc. The intake capacity for U.G. programme has been increased to 64 from 32 since academic year 2004-2005. The Agricultural Engineering curriculum was revised in 2009 as per the recommendations of IV Deans Committee. Further since 2012-13 the Experiential Learning Programmes have been implemented at under graduation level to strengthen the professionalism in students. The post-graduate programme leading to M.Tech. degree has been started in the year 1998 in soil and water conservation engineering and in Agril. Process Engineering; Farm Machinery and Power, Irrigation and Drainage Engineering in 2002 respectively. Up-till now about 120 students have gone for higher studies at places like IIT, Kharagpur, IIT, Powai, Udiapur, Akola, Rahuri, and Raipur.

The faculty had implemented several innovative researches and extension projects independently. All India Coordinated Research Project has been implemented in the College since 1997 on Energy in Agriculture. Some of these projects were financed by State and National agencies like ICAR, Ministry of Water Recourses, Maharashtra State Government, etc.
The Faculty established Solar Energy Park and Model unit of Processing of Oilseeds and Pulses under Experiential Learning Project. The faculty also established one Testing centre of Farm Implements under RKVY project.

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- **Present Status of Institution**

At present the College of Agricultural Engineering and Technology is running B.Tech. (Agril. Engg.) and PG programme in four departments i.e. Irrigation & Drainage Engineering, Soil & Water Conservation Engineering, Agricultural Process Engineering, Farm Power and Machinery along with Ph.D. programme.
The college has seven departments with well equipped laboratories, namely Agricultural Process Engineering, Electrical and Other Energy Sources, Farm Machinery & Power, Farm Structure, Irrigation & Drainage Engineering, Soil Water Conservation Engineering and Basic Science & Computer Technology. A well-equipped computer laboratory is established in the college with software facilities like ARIS/LAN, A to Z Watershed software, CAD-CAM Laboratory with advanced facility to design software like ProE, Ansys are installed with licenced capacity of 25 students, advanced equipments like Total Survey Station, Neutron Probe, Leaf Area Meter, Engine Test Rig, Laser Leveller, Texture Analyser, Bakery Unit, Hunter Colour Lab Meter, Water activity meter, Extruder are available for students practical and demonstration. Reading room with sufficient book facilities have been established in college building itself. A separate hostel building with accommodation capacity for 140 students is available for the college. Air

conditioned seminar hall equipped with Audio-video aids has been developed for conducting various functions. Similarly, common examinations are conducted in a spacious examination hall equipped with closed circuit camera. Three model digital classrooms are established for effective teaching.

The students of the college have an independent playground, Gymkhana, National Service Scheme, Training and Placement Unit. The different scholarships available in the College for the students are GOI scholarship, Freedom fighter, National merit, Merit scholarship, ICAR scholarship, NTS etc.

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The College of Agricultural Engineering has successfully established an Experiential Learning Unit on "Processing of pulses and oilseeds" sponsored by ICAR, New Delhi. The cost of the project was 92 lakhs. The students of B-Tech (Agril. Engg.), offering relevant cafeteria courses and M-Tech (Agril. Process Engg.) are gaining practical experience which is integral part of their educational programme. Students also secured jobs in food processing industries. Industry -University attachment is established through the research recommendations coming out through various experiments in the R& D section of pilot plant.

A project on Sustainable Rural Livelihood Security through Integrated Approach in Hingoli and Nanded districts of Maharashtra was implemented under NAIP during 2008 to 2012 with total budget outlay of Rs 105.00 Lakhs. About 15 % population of Hingoli district of Maharashtra state comprises tribal community. Out of total cultivable area, 82 % area is under rain fed agriculture. Ground water level in most of the areas of these districts was depleted to the extent of getting economic and assured well yield during 2009 and 2010. Watershed Development Programmme was implemented in Karwadi-Nandapur villages of the district, having the watershed area of 750 ha. Non-cultivated area was characterised by barren hilly, elevated degraded lands with slope ranging from 10 to 20 per cent. In the development project, deep contour trenches on 150 ha area, 13 Vanrai bandharas and 5 loose boulder structures were constructed for moisture conservation, rainwater harvesting and erosion control. The Faculty established Solar Energy Park displaying all working models of farm implements on solar energy.

A land development work had been undertaken at University Campus on large scale. This enables to bring more area under cultivation and also increased seed production. Under RKVY, the project on development of irrigation potential for enhancing seed production was carried out at College of Agril. Engg & Tech. Under this project, deepening and widening of Pingalgarh Nala was done for safe disposal of runoff water and water harvesting.

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Different types of Agricultural Engineering extension education programmes such as extension camps, exhibitions, radio talks, TV programmes, training programmes, workshops, publications, demonstrations, entrepreneurial guidance and counseling are organized in Marathwada region.

Mission and Goals

- **Mandate of the Institution**

The institute is working with three mandates viz. education, research and extension. The institute imparts quality education and conducts applied research and transfers the technologies of Agricultural Engineering to farmers and students.

- **Mission Statement**

To impart professional knowledge and skills to the students to empower them for self -employment

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Goals

- To meet the need of farmers, industries, R & D organizations and education institutions.
- To develop capabilities to face the challenge and overall to excel students in their profession.
- Continuing education to impart for re-engineering on socio-economic systems in the light
  of global technology changes.

Current mission

- To educate graduates and post graduates in the field of Agricultural Engineering so as to prepare them as leaders in industry and profession.
- To upgrade the laboratories and infrastructure facilities for providing quality education.
- To conduct need based quality research by applying engineering principles to solve problems of agricultural system and also making sincere efforts to transfer the Agricultural Engineering technologies for empowerment of students and farmers.

Objectives

- To impart knowledge and entrepreneurial skills to students through education in design, development, manufacturing and operation of equipment, processing and value addition and efficient use of agricultural inputs and natural resources, including different forms of energy in agriculture.
- To conduct research on development of machines/technologies with an aim to mechanize various farm operations as well as post harvest processing operations.

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- **Future goals and Objectives**
  - To upgrade the laboratories of Institute.
  - To update the faculty by exposing them to higher studies.
  - To establish Institute -Industry linkage.
  - To establish MOU between various research organization and institute to conduct innovative research projects.

- **Short and Long Term Plans**

Short Term Plans

- To upgrade the laboratories of Institute
- To update the faculty by exposing them to higher studies.

Long Term Plans

- To establish Institute -Industry linkage.
- To establish MOU between Research organization and Institute to conduct Innovative research projects

Organization and Governance

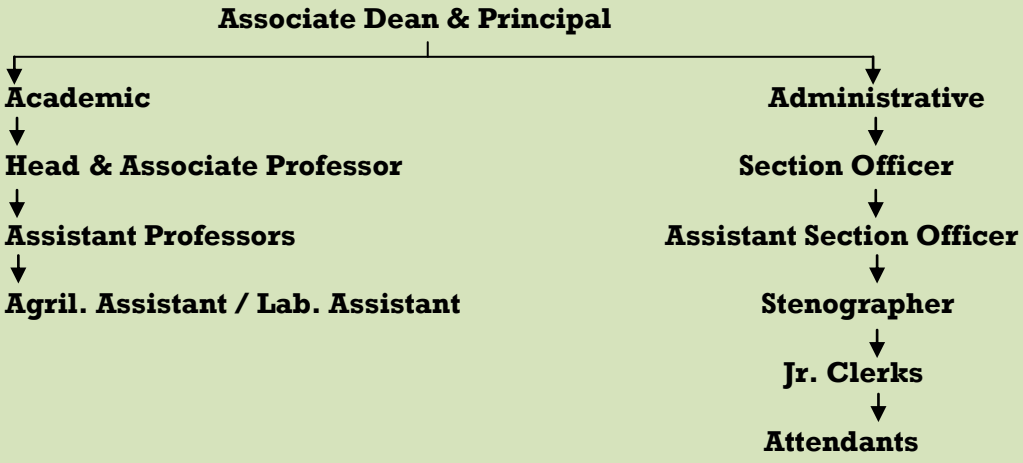
- **Authorization**

Associate Dean and Principal of the college is authorized to guide and monitor the working of the institute.

- **Authorities and their composition, powers and responsibilities**

The Faculty follows the Maharashtra Agricultural Universities (Krishi Vidyapeeth) Statutes resolved in the year 1990.

- **Organizational Structure**



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- **Adoption of ICAR Model Act and Guidelines**

The faculty has fully adopted ICAR model act and guidelines for implementation of all educational, research and extension programmes.

Academic programmes and curricula

- **UG and PG programmes**

(I) **Under Graduation**

The College of Agricultural Engineering with four-year degree programme commenced from 1986. The intake capacity was 32 and the students passed from XII standard in 10+2 pattern or equivalent were admitted. The degree programme was designed to have first year multidisciplinary education in different branches of Agriculture and Allied Science, basic courses of Electrical, Mechanical and Civil Engineering. The total credit load was 183. With changing trends the curricula was restructured in 2009. The fixed course constitute 136 credit load for the first three years; and in the seventh semester, a student will be required to have a project of six credit hours, seminar (one credit hour) and a minimum of 15 credit hours from the cafeteria courses. The recommended new curriculum also includes courses on computer programming, data structures, CAD / CAM machine drawing, entrepreneurship development, communication skills, agri-business management, besides modifying the basic engineering and agricultural engineering courses taking into account the technological developments that have taken place during the last decade. Further, the Cafeteria courses and the in-plant- training in eight semester will help in building confidence and improving the employment opportunities of agricultural engineering graduates.

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(II) **Post Graduation**

The post-graduation programme in the College of Agricultural Engineering was implemented from 2004 in four departments with an intake capacity of 4 students in each. The new and restructured PG programmes in Agricultural Engineering & Technology have been designed by taking into consideration demands of private sector harnessing commercial aspects, modern research tools and their applications, supplementary skills required and enhancing the global competitiveness and employability of students. The major specializations in the discipline of Agricultural Engineering for degree M. Tech. and Ph.D degree are : (i) Farm Machinery & Power Engineering; (ii) Processing & Food Engineering; (iii) Soil and Water Engineering and (iv) Irrigation and Drainage Engineering. Apart from the Agricultural Engineering courses, the courses from the Dept. of Basic Science and Computer, Bio-Chemistry, Food Technology, Agricultural Extension, Economics and Statistics plus 6 non-credit compulsory courses are included in the curriculum to have integrated agro based interdisciplinary approach in education.

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Mode of Admission

Central admission at MCAER level is done for UG and PG. Selection for admission of new candidates to the first semester of undergraduate courses is made in accordance with the regulations made by MCAER, Pune.

Academic Regulations

Academic regulations formulated by the University are followed and time-to-time minor revisions are made which are approved by the Statutory Bodies.

Curricula Development / Revision Process

- The course curriculum of Agricultural Engineering B.Tech (Agril. Engg) is revamped in 2009. The Curriculum is modified for incorporating cafeteria courses and In-Plant training Programme.
- PG programme in the Dept. of Farm Machinery & Power Engineering, Agricultural Process Engineering, Soil and Water Conservation Engineering and Irrigation and Drainage Engineering was revamped as per the recommendations of National Core Group ICAR, New Delhi and it was implemented in 2009-10.

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- **Adoption of ICAR Model Curricula and Deviations**

The College has adopted the curriculum approved by the ICAR with 20 per cent changes as per the regional needs.

Industrial exposure to students

UG Students are exposed to one month training after IVth and VIth semester in various industries and research organization in which they are exposed to practical knowledge and technical skills.

Students working in field

Students working in Solar Energy Park

The evaluation of the students is done by Subject Matter Specialist / Coordinator through visits at different intervals. During their visits, Subject Matter Specialist / Coordinator receive the oral feedback from the industry/organization regarding the impact of their programmes and the benefits received due to the students services. Feedback from the students is also obtained through seminar. The detailed reports of training programme are submitted by the students.

Students performing practical in the field

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Accomplishments and Challenges

- The College has started its journey by offering the under graduation degree of four years with a student intake capacity of 32 and it increased up to 64. Well-equipped Laboratories of each department are established.
- The PG programme was initiated in 1998 in the Department of Soil and Water Conservation Engineering. Later on PG programme started in other three departments viz; Department of Agril. Process Engineering, Department of Irrigation and Drainage Engineering and Department of Farm Power and Machinery in 2004.
- In total 33 research recommendations are approved in Joint Agricultural Research Committee at State level during 2008-2012 for the developed machineries, equipments, process technologies and value added products.
- Innovative research projects were implemented with the financial assistance of ICAR New Delhi, Ministry of Water Resources, RKVY and State Govt. of Maharashtra etc.
- Established Solar Energy Park, a model demonstration unit on processing of oilseeds and pulses, developed Watershead at Nandapur. A land development

work had been undertaken at university campus on large scale. It enables to bring more area under cultivation and also increased seed production. Under RKVY, the project on development of irrigation potential for enhancing seed production was carried out at College of Agril. Engg & Tecch. Under this project, deepening and widening of Pingalgarh Nala for safe disposal of runoff water and water harvesting.

- Under RKVY project, Testing Centre for implements and machineries had been established. This centre helped farmers from Maharashtra State to have good quality of farm implements. This centre facilitated small entrepreneurs to have precise production machinery. Through this project revenue of Rs. 30 lakhs had been generated through testing and sell of the implements.
- Build up the bridge between students, teachers, farmers and industry by celebrating many special days like Engineer's Day, Water Day, Vishwakarma Day, Women's Day, World Food Day and Youth day.
- Effective professional linkages are developed with KVKs, Self Help Groups, NGOs, Schools, District Industry Centre, Dept. of Agriculture and Department of water resources etc. for effective transfer of Agricultural Engineering Technologies.

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Challenges

- To develop well equipped laboratories and infrastructure facilities in the departments
- To run Experiential Learning Programme effectively and efficiently with the changing trends of marketing demands
- Formulate need based research and extension projects on the basis of feedback and challenges faced by farmers and industries
- Exploring the funds from various agencies for research and extension projects to carry out need based research and extension in various domains.
- To establish MOU with reputed research organization, universities and industries for having collaborative research and extension projects.
- To update the faculty by exposing them to higher studies.
- To establish Institute –Industry linkage.

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