Govt. College of Engineering, Karad

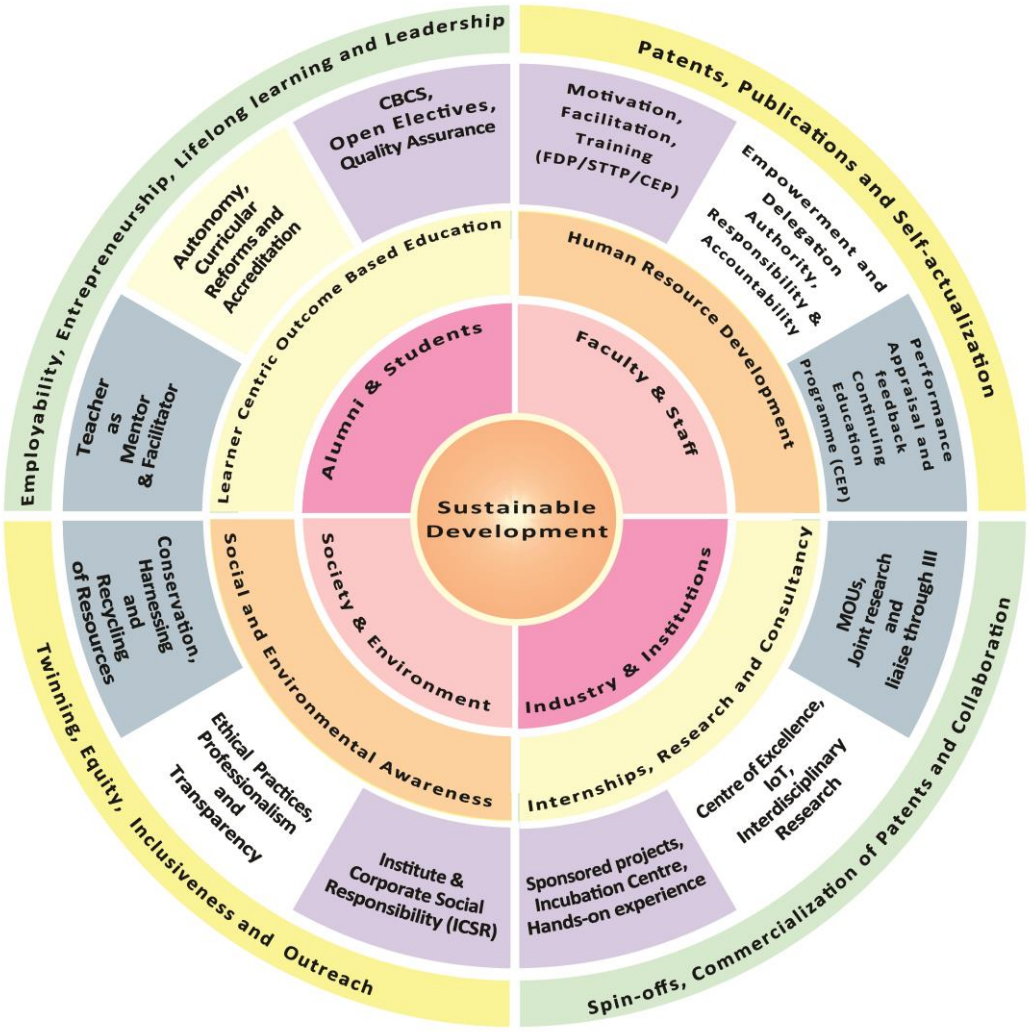
(*An autonomous institute of Govt. of Maharashtra, accredited by NBA, New Delhi*)

Institute Development Plan

After celebrating its golden jubilee in the year 2011, **GCEK** has acquired the highly sought-after status of an **Autonomous institute** from the academic year 2015. Since then, eleven out of the twelve of its academic Programmes have been **accredited by the National Board of Accreditation (NBA)**, New Delhi adding a feather in its cap. This stands as a proof of the fact that Outcome Based Education **(OBE)** is being implemented in a vibrant academic ambience. GCEK looks forward to achieve a high level of excellence in education and research with its vision statement,

"To emerge as a technical institute of national repute, driven by excellence in imparting value based education and innovation in research; to face global needs of the profession"

The strategic action plan for the sustainable development depicted below outlines a roadmap for realizing this vision.



Embedding Sustainability- A 360^0 View of Strategic Institute Development Plan (IDP)

Paradigm shifts in education and engineering are underway, and massive online courses and search engines make knowledge readily available. At this juncture, it is appropriate to retrospect as well as visualize the future. A realignment of educational edifices appears inevitable and the Board of Management at GCEK intends to provide dynamic leadership that is dedicated to educating engineers of the future. Research and Development cell of the institute will serve as a crucible to develop new pedagogical methodologies to enhance the learning experiences of students; advance the state of the art of engineering pedagogy; and be an intellectual resource for engineering faculty to enhance their pedagogical skills.

The stake holders, viz., the alumni & students, faculty & staff, industry & institutions and the society & environment will work together for institute building and self development.

The strategic plan designed by the institute is based on four pillars of Institutional development.

i) Learner centric outcome based education

ii) Human resource development

iii) Social and environmental awareness

iv) Internships, Research and consultancy

The stakeholders are committed to successfully implement this plan by overcoming challenges that come in the way.

Key challenges

To realize this dream it is necessary to overcome a few challenges that have been an integral part of the institute's constitution. So far there was very little academic, administrative and financial freedom on the part of the head of the institute. This lack of flexibility and freedom used to put tremendous restrictions in the development and change process. However, with the state Government's policy of encouraging the institute to become autonomous has made a paradigm shift in the governance of the institute in the recent past. This has given huge impetus to implement new ideas and systemic changes at all levels. Amongst the major challenges that need to be overcome are-

-Faculty/staff shortage and transfers

-Outdated recruitment and appraisal system

-Shortage of building/academic area

-Obsolete and inadequate machinery and equipment

-Ill maintained campus, hostel and residential facilities

The autonomous status acquired in 2015 has provided leverage to implement necessary changes in policies and procedures and find solutions to these challenges. By overcoming these challenges the institute is developing and establishing itself as one of the premier autonomous institutes, imparting excellent technical education, carrying out research and development in thrust areas and contributing to the needs of the industry. The students graduating will be industrious and more employable with perpetual learning abilities and adaptability towards the needs of the industry.

The overall development is focused on long lasting benefit to all stakeholders. The strategic plan lays emphasis on "Sustained Development" of the reforms introduced for the overall quality improvement of technical education. Action plan is laid out and well defined to achieve the general and specific objectives through a concerted approach. The short-term, medium-term and long-term goals are chalked out as under,

The short-term goals

- To get the Electronics & Telecommunication (E&TC) programme accredited by the NBA
- Initiation of process to start New Post graduate Programme in
  - Design Engineering at Mechanical department
  - Computer Science & Engineering at IT department
- Apply for QIP centre for Ph D and Post graduate programs to Government of India in Civil, Mechanical , Electrical and IT department
- Offering piping engineering course under CEP
- To undertake institutional reforms and effective governance
- To fill up vacant faculty positions
- To enhance the knowledge competence of faculty by participating in various FDPs, STTPs to disseminate the same to students through courses.
- At least one publication by each faculty in reputed Journal/conference
- Revised Training Need Analysis is to be conducted for faculty and staff
- Training on advanced skills based on industrial environment to be arranged for the faculty, staff and students of the department
- Faculty development through qualification, publication, training, study tour, short term courses
- To upgrade laboratories and teaching-learning infrastructure
- Development of virtual laboratories in the institute
- To setup new laboratories for advance courses
- Development of 02 smart classroom with smart board, video lecture recording and learning material development facility
- To refurbish existing amenities with adequate space and appropriate place
- To establish campus wide network with intranet
- To increase employability of graduates
- Number of expert lecture by industrial / field experts shall be enhanced
- Number of industrial visits of student and faculty shall be enhanced
- To develop spirit of entrepreneurship, industry and diligence
- To promote awareness of Intellectual Property Rights (IPR)
- To enhance liaison with industry and undertake collaborative activities
- To create conducive atmosphere to undertake R & D activities
- To organize National/International Seminars & Conferences
- Implementation of 5S concept in the institute

The medium term goals

- To establish state-of-the-art laboratories
- Establishing Centre of Excellence in
  (1) Waste Water Characterization and Testing

(2) Non-Destructive Testing
(3) Industrial Measurement, Testing and Calibration Centre
(4) Power Electronics Drives and Renewable Energy Lab
(5) Condition Monitoring of Plants and Machineries (up gradation of existing facility)
(6) Thermal, Fluid and Energy Engineering

- Establishing NABL accredited lab
  - Mechanical Dept: Metrology lab
  - Electrical Dept : Electrical Measurement and Calibration
- To establish Incubation Centre
- To establish Internet of Things (IoT) hub
- To establish strong Industry Institute Interaction
- Employability enhancement program through CBCS curricula, credit transfer to online completed course, soft skill courses, industry visits, trainings, internships, entrepreneurship development programs and short terms courses
- To establish state of the art library
- To establish a 2000 capacity auditorium
- To establish student activity centre (SAC)
- Industry sponsored Research /Application development Laboratories in the institute.
- Support centre for higher studies, preparation for competitive exams, etc.
- Information Technology enabled Community services for general Society.
- Re applying for NBA for accreditation for all UG and PG program.
- Development of infrastructure for above activity, clean room, video recording theatre
- Ban Wi-Fi in the campus to address bio degradability issue and promote wired connection only.

The long term plan

- To achieve deemed university status
- To become financially autonomous
- Achieving self-reliance by enhanced testing, consultancy an industrial sponsored projects
- Installing Industrial chair at least one in each department
- Collaborative research with Industries and academia

These plans will be implemented with the focus on the students. Priority will be given to create excellent academic ambience, high-tech community based educational infrastructure, state-of-the-art facilities for curricular, co-curricular and extra-curricular activities.

The mission of the institute is-

"To create professionally competent engineers driven with a sense of responsibility towards nature and society"

This mission will be accomplished with a multi pronged strategy and different aspects of development will be dealt with a pragmatic approach. An elaborate action plan for different areas of development is in sight and activities are initiated in that direction as under.

Governance

The institute has a highly experienced Board of Management (BoM) comprising of educationists, entrepreneurs and industry experts. Effective governance shall ensure continuous growth of GCEK. It is

very essential that in the days to come effective and modern governance structure and processes will be in place. A transparent and participative decision making process will be followed. Effective governance will be ensured through the process of automation by implementing intranet and MIS/ERP software in all administrative and academic processes. The decision-making process can also use the IT tools. The agenda and issues of several committees such as BoM, Academic council, Building and Works Committee (BWC), Finance committee, APEC and BoS, etc. can be discussed on video conferencing. This will reduce the burden of administrative load on faculty members and will improve the efficiency of decision making.

Undergraduate education

The institute is improving the environment of undergraduate education in the first phase of autonomous curricula started from the year 2015-16. The goal of this endeavour is to make the curriculum more flexible. Students feel motivated to acquire skills, learn principles and imbibe a spirit of innovation.

The following action plan is suggested to sustain this process

The institute will undertake a review of the undergraduate academic environment on regular basis. This review will include the academic process such as examination pattern, hands-on experience, grading system student counselling as well as curriculum contents. The review will be based on students' feedback, industry inputs as well as best practices adapted by other universities and institutes.

The laboratories are being improved considerably in the recent past and the process will continue further. A new complex of core laboratories will be set up soon. More emphasis will be placed on the concept of "learning by doing". Students will be provided ample opportunities to innovate and implement their ideas in an environment which distresses the present concept of earning marks either by mathematical problem-solving or memorizing facts. Every student should be able build a portfolio of work done at the institute.

Special efforts are being taken to improve student faculty relations by way of Induction Programme. Students interact with faculty on a residential campus at occasions outside the class room. This provides an experience of "learning outside class rooms". In order to facilitate such an atmosphere, professional student bodies and various clubs are made active with several events and programmes.

The spirit of research is a key element of any institute. This spirit needs to be fostered not only in the post-graduate students but also in the undergraduate students. Project exhibitions, participation in project competitions are being encouraged through generous funding. Summer research school, special credits for research work and involvement of students in sponsored research projects are some of the activities that need to be enhanced.

Postgraduate education

The institute is committed as a mission to transform the complexion of the post-graduate education in the next 5 years at GCEK. The following action plan is suggested.

- To encourage final year UG students to work along with PG students on seminar and projects to give these students a glimpse into research activity.
- Faculty members are encouraged to undertake promotional programmes and showcase their research to attract PG students from other institutes and universities.
- Institute level assistantship is provided to Non-GATE PG students.

- Each department will have a research retreat (in-house workshop) every year.

Student activities

It is to be emphasized that the education at GCEK wishes to make students multidimensional and all round.

With the growth of student population in the campus, the planning of facilities, management of hostels, the organization of events, the maintenance of student relations are very sensitive and crucial issues. The involvement of faculty in many student-related activities such as culture, sports, workshops, seminars, industrial visits, in-plant trainings, community services, etc. needs considerable improvement. The fee structure also needs a careful review. The fees should be commensurate with the quality as well as expenditure incurred. The student counselling service needs to be strengthened. It is necessary to provide career counselling, academic counselling, personal counselling and professional counselling. Further it is necessary to provide training on soft-skills, motivation and other aspects of behaviour & attitude. It is necessary to provide guidance for higher studies in India and abroad. Those having a flair for entrepreneurship need to be encouraged and given support.

All the above mentioned issues will be addressed in a rational, logical and realistic manner. Further, it is expected that sports and cultural activities will be strengthened in the coming years for the students with a corresponding strengthening of the infrastructure for these activities.

Human Resource Development

The faculty strength of the institute has decreased considerably. The quality of technical and administrative staff needs to be improved considerably. A comprehensive HRD policy is required for this purpose. All staff members must undergo continual training and appraisal.

The institute has started more privatization of various support activities such as house-keeping, building maintenance, electrical maintenance, campus wide network, computer laboratories, security, cleanliness, etc.

Sponsored Research

It should be made clear in an emphatic manner that sponsored research activity is an important as well as an integral part of the academic activity of the institute. Every faculty member is expected to participate in this activity. A fair amount of internal revenue will be generated through this activity.

The areas of research, particularly of interest to institute, can broadly be classified as

- Disaster mitigation and earth quake engineering
- Remote sensing
- Computational and experimental fluid/thermal engineering
- Condition monitoring
- Precision manufacturing and engineering

The institute will strive to set up interdisciplinary research groups where postgraduate and PhD students will work closely with industry.

Alumni association

A new lease of life will be injected in the alumni association to derive benefits of the rich experience and positions that our alumni hold in India and abroad. The institute would establish a vibrant alumni

relationship and regular meets will be arranged to enhance industry institute interactions, and inculcate entrepreneurship and leadership qualities in the student community.

Social Responsibility

Community Service Programmes (CSP) will be undertaken on regular basis with the participation of students, faculty and staff of the institute. These services will be provided to the under privileged sections of the society, farmers, personnel of small scale industries, etc.

Environment and Ecology

A general awareness for environment and ecology will be created in the campus community by undertaking various programmes.

Green campus will be developed by undertaking plantation. The concept of rain water harvesting and waste water treatment and recycling will be implemented.

All buildings will be built with these concepts and existing buildings will be refurbished accordingly.

To realize the vision of development of the institute a comprehensive budgetary plan has been prepared for carrying out these developmental activities in a phased manner over next decade.

Preamble

The proposed IDP will be implemented in a systematic manner over the next decade for following six components-

1. Infrastructure
2. Research & Innovation
3. Equity Initiative
4. Faculty Recruitment Support
5. Faculty Improvement
6. Vocationalization of Higher Education

The implementation strategy involving objectives, important activities and expected outcomes is presented in brief as under.

Implementation Strategy

1. Infrastructure

A master plan of the campus of Govt. College of Engineering, Karad, spread over 40 acres, has been prepared for next decade by taking into consideration current infrastructural deficiencies and future growth. All major stake holders have contributed in the process of planning green, clean and smart campus. The Building Works Committee (BWC) is steering and executing the plan in consultation with architects and professionals in the field. These plans are implemented with the focus on the needs of the students. Priority is given to create excellent academic ambience, high-tech community based educational infrastructure, state-of-the-art facilities for curricular, co-curricular and extra-curricular activities. attention has been given to provide Adequate

space and appropriate place for all facilities and amenities. The salient features and landmark activities are,

- **Academic infrastructure:** Lecture complex, Central library, ENTC building, Building for centre of excellence(s), Incubation centre, and Lecture theatre with video recording facility, *etc*.
- **Basic amenities:** Hostels for under privileged (SC/ST girls), Auditorium, Student's Activity Centre (SAC) are planned to ensure equity and all round development.
- **Extension of existing building:** PG Education and Research Centre, PG hostel, Academic/Examination Centre are planned.
- **Smart campus features**: A single integrated application that automates all processes on the campus for better efficiency and lower costs is envisaged to have following feature

Smart Campus: Integrating administrative and academic functions

- Smart Card and Biometrics based access, configurable to comply with the rules and regulations
- Secure role based access – control who should see what information
- MIS modules covering – Admissions, Fees, Academics, Examinations, Library, Hostel, HRMS and Payroll to name a few
- Dynamic report dashboard – to easily create or view different reports
- Automation of everyday functionalities like – Time-Table, Attendance, Book Issue / Return, Dues Collection, etc.
- To provides the Principal and Management more control over the operations of all the processes in the campus and facilitates better informed decisions
- Students & Staff can view their personal, financial and academic information using the smart card within the campus

- To facilitate the academic departments to configure the academic calendar and lesson plan that help them monitor academic progress during the entire term
- Information accessible online or via information kiosks
- Calendar scheduling and collaborative features for connecting all stakeholders – via online, Email and SMS functions

- **Eco-friendly and energy efficient campus:** Rain water harvesting, Recycling of resources, Solar roof tops for major buildings, Waste to energy, Biogas plants, Sewage treatment plant (STP), etc.

2. Research and Innovation

At Govt. College of Engineering, Karad our goal is to foster an institutional culture which recognises and supports the development of the widest possible range of high-quality research and innovation activities to which staff and students contribute. It should be made clear in an emphatic manner that sponsored research activity is an important as well as an integral part of the academic activity of the institute. Every faculty member is expected to participate in this activity. A fair amount of internal revenue will be generated through this activity. The institute will strive to set up interdisciplinary research groups where postgraduate and PhD students will work closely with industry. Major initiatives and expected outcomes in this direction are as under:

- Collaborative research with Industries and academia: the areas of research, particularly of interest to institute, can broadly be classified as
    - Disaster mitigation and earth quake engineering
    - Remote sensing
    - Computational and experimental fluid/thermal engineering
    - Condition monitoring
    - Precision Manufacturing and Engineering
    - Internet of Things (IoT)
    - Renewable energy and Power system quality
    - Non-destructive testing and structural health assessment

Internet of Things (IoT): Innovation hub for integration of systems, devices and operations

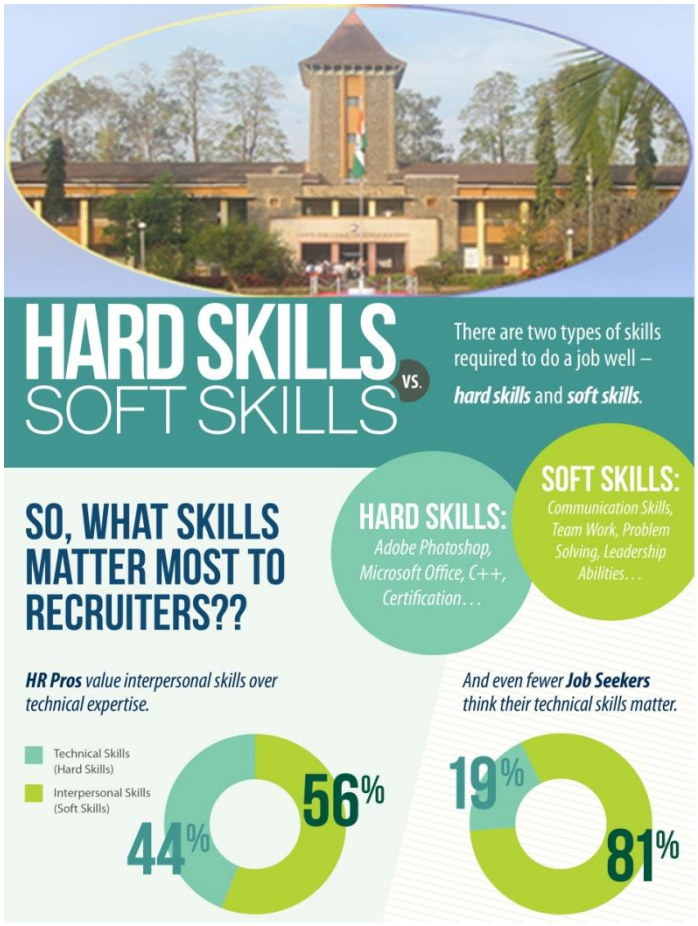
- Starting up an Incubation centre fully equipped with facilities.
- Expand our postgraduate research student numbers, enhancing their contribution to our research community and preparing them for rewarding careers.
- Adopt clear principles outlining how we define research and innovation activity among faculty across the institute, and integrate these principles into workload allocation, performance appraisal reviews, promotion criteria, and future strategic investment planning.
- Direct significant levels of funding to drive strategic initiatives, with effective prioritisation, support and monitoring to ensure an appropriate return on investment.
- Provide an infrastructure that improves the capacity and capability of our researchers to seek competitive research and innovation grants (AICTE, DST, MHRD, private and public sector Industries, etc.) and engage with end users of research, both nationally and internationally.
- Ensure staff research and innovation interaction with external organisations enhances the experience of our students by building partnerships in sectors of prime relevance to students' programmes of study and future careers.
- Embed research and innovation expertise within undergraduate and taught postgraduate curricula wherever appropriate, and develop channels for student input into research and innovation activities and culture.
- Improve our postgraduate research culture and enhance our supervision capacity to support increased numbers of postgraduate researchers.

- Introduce new excellence awards for staff, celebrating success in bringing together teaching, research and innovation.

3. Equity Initiative

We respect and celebrate diversity and equal opportunity through an inclusive culture at the institute. As per Government reservation policy, Govt. College of Engineering, Karad admits students from socially and economically underprivileged strata of society, addressing gender equality, equality without any bias of cast, creed, religion and ethnicity of students from all over Maharashtra including northeast states and Jammu-Kashmir. Following initiatives are undertaken for equity,

- Provision for concession in academic fees as per Govt. norms is made, in addition some genuine cases of economically weaker students are partially supported from institute fund.
- Extension of hostel capacity is planned to accommodate all such students
- Remedial classes are arranged for academically weaker students Employability enhancement by imparting soft-skills, subject specific training and



Equity Initiatives: Soft skills and selective intensive hard skills to suite aptitude of students

- industrial exposure
- Industrial internship as an essential part of curricula
- 100% assistance in placement

- Enhancing technical capabilities and aptitude through special coaching

4. Faculty Recruitment Support

The faculty strength of the institute has decreased in the recent pass, particularly due to termination of services of the contractual faculties. A comprehensive HRD policy is being formed to ensure adequate availability of quality faculty at all levels (UG, PG and PhD) and ensure capacity building at all levels of employment.

Over and above traditional methods of recruitment (newspaper advertisement, response, scrutiny, rounds of interviews and then joining) wherein both the recruitment cost and recruitment cycle time are getting very high day by day, it is necessary to take support from technology in faculty recruitment process.

Technology is finding increasing presence in recruitment all over the world. Ease of handling technology, availability of latest customized versions, increasing comfort level of end users are some of the features of modern day technological usage. Candidates also find value in technology. Candidates develop positive perception of an organization that employs technology tools as part of the recruitment process. The reason being that the candidates are also techno-savvy these days and are reluctant to undergo routine process mentioned above.

Technology makes the interview process more efficient which is need of the hour. Also it addresses personal biases of selectors.

We can consider three technology interventions being online interviews—skype/ google hangout, behavioural & technical online assessments, followed by automated calling apps which are well within reach

Availability of these technology tools makes it definitely easier to find and apply for jobs today, and social and professional networks are the most effective channels through which one can find a job, over and above job portals and employee referrals. This combination can work out in favour of the Institute.

Various measures are undertaken to mitigate this issue as under,

- Recruitment of visiting, adjunct and emirates faculty from industry experts, retired teachers and professionals is undertaken.
- Young faculty is motivated to undertake qualification enhancement by providing research facilities in-house.
- Financial support is provided to faculty members for participation in workshops, symposia, conferences at national and international level for presenting research papers.
- Career Advancement Scheme (CAS) is implemented to promote faculty

5. Faculty Improvement

Various initiatives are being undertaken to implement Outcome Based Education (OBE) as per ABET and NBA guidelines. In addition to knowledge up-gradation by way of FDP/STTP, various other practices are followed for faculty improvement and, thereby, achieving enhancement of teaching learning process. Faculty of the institute engage themselves in

various activities to steadily improve teaching and learning over time. Following is a gist of some of the self-development activities

- **Feedback on Teaching**
  - Use of online student rating results to make course improvements.
  - Collection of mid-semester student feedback (e.g., Class monitor meeting).
  - Student counselling on learning difficulties by Teacher-guardian scheme
  - Analyze student assessment data to identify trends in student performance and problems to be remedied by changing teaching strategies, course content, and learning activities, etc.

Faculty Improvement: Motivation, facilitation and empowerment

- **Development of Instructional Skills and Materials**
  - Compare your course plan with someone teaching the same or a similar course.
  - Share and discuss your teaching strategies and materials with another instructor.
  - Improve the quality of your exams and other assessments tools, rubrics, etc.
  - Write an article for a professional teaching and learning improvement journal in your discipline, highlighting an innovative course design or approach to teaching.
- **Improve Course/Program Design and Alignment**

- Invite student feedback on the congruency of course objectives, learning activities, assessments and evaluation of outcomes.
- Discuss with the department chair the alignment of course learning objectives (CLO) with program outcomes (PO) and the programme educational objectives (PEO).
- Share and discuss course learning objectives and materials with those teaching other courses in the same curriculum sequence.
- Discuss course improvement plans with appropriate curriculum committees or department chair.

➢ **Learn More About Teaching and Enhancing Student Learning**

- Subscribe to a publication on college teaching and discipline-specific journals.
- Attend a research conferences
- Write a book
- For newer faculty: induction programme, Teaching Tips and Tools

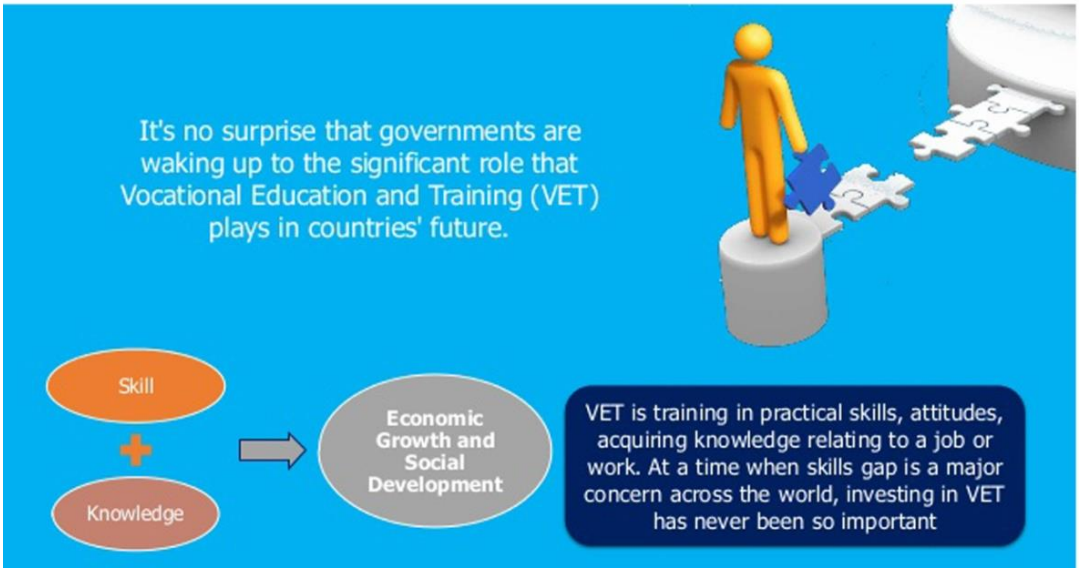
6. Vocationalization of Higher Education

Skill training activities are undertaken to develop practical skills of various engineering disciplines at different levels such as ITI, Diploma, Graduates as well as Post graduate students. In addition, community service programmes (CSP) are undertaken on regular basis with the participation of students, faculty and staff of the institute. These services are provided to the under privileged sections of the society, personnel of small scale industries, etc.

Vocational Education and Training (VET) is an important element of nation's education initiative. For Vocational Education to play its part effectively in the changing global environment, it is imperative to redefine the objectives of vocational education and training and to make it flexible, contemporary, relevant, inclusive and creative. It is important to recognize that with more than 35% of citizens aged below 15 years, 700 million young people below 35 years and population growing at 1.8% per annum, India is expected to become the global powerhouse of human resource by 2025. This large population can reap rich dividend for the country through a focus on providing quality vocational education and training.

In the changing global scenario, employment possibilities of graduates and postgraduates are becoming increasingly limited. The education imparted at degree level is not oriented to the market needs and neither is it skill based. Due to this changing nature of work and employment, individuals now look for more flexible and multi-skilling learning opportunities for mobility across employment sector and geographic locations. The general education system has not been able to provide these opportunities. The functioning of the educational institutions, as well as the educational choice of the youth, has remarkably been influenced by the market economy. The lack of employment opportunities to conventional graduates has led to the shifting of focus on the skill based, industry oriented teaching learning

pedagogy. Traditional education which only creates knowledge, although important for basic development of a person, is fast losing its role as a means for human and societal growth. In our country, the growing unemployment amongst the educated youth is posing a serious concern to the value of traditional education in the context of leading a better quality of life. The inability for our youth to apply what they have learnt to improve their daily life or generate gainful employment is causing them to question the very essence of such an education system. It is thus imperative that as a society we must re-look at what should be the objective or outcome of our education system. In present economy, the objectives of a society have also changed from fulfilling the basic needs of all round development to empowerment. The education system instead of going by text-book teaching needs to be promoted by skill based teaching learning pedagogy. The human resource instead of being unskilled or semi-skilled needs to be knowledgeable, self-empowered and flexibly skilled.



Vocationalization of Higher Education: Bridging the gap

We can consider starting short term certification courses (duration 1 month- 3 months) in following areas-

- Skill Development Programmes
    - Mechatronics and SCADA

- Solid Modelling and Engineering Analysis
- CNC/VMC Courses
- CAD/CAM Courses
- Supply Chain Management
- Enterprise Resource Planning (ERP)
- Electrical Measurement and Testing
- Maintenance and Repair of Electrical Domestic Appliances
- Civil Construction/Maintenance
- Building and Road Construction
- Building Maintenance
- Android Application Development
- Ethical Hacking
- Mobile technologies, etc.

➢ Community Engagement and Outreach Efforts

- NSS
- Unnat Bharat Abhiyaan
- NASCOM Digital Literacy Programme (MoU)

The new initiatives are being implemented with cooperation and collaboration with all the stake holders. The impact of these initiatives will be assessed on a regular basis and corrective measures will be taken to ensure that the vision is realized in letter and spirit.