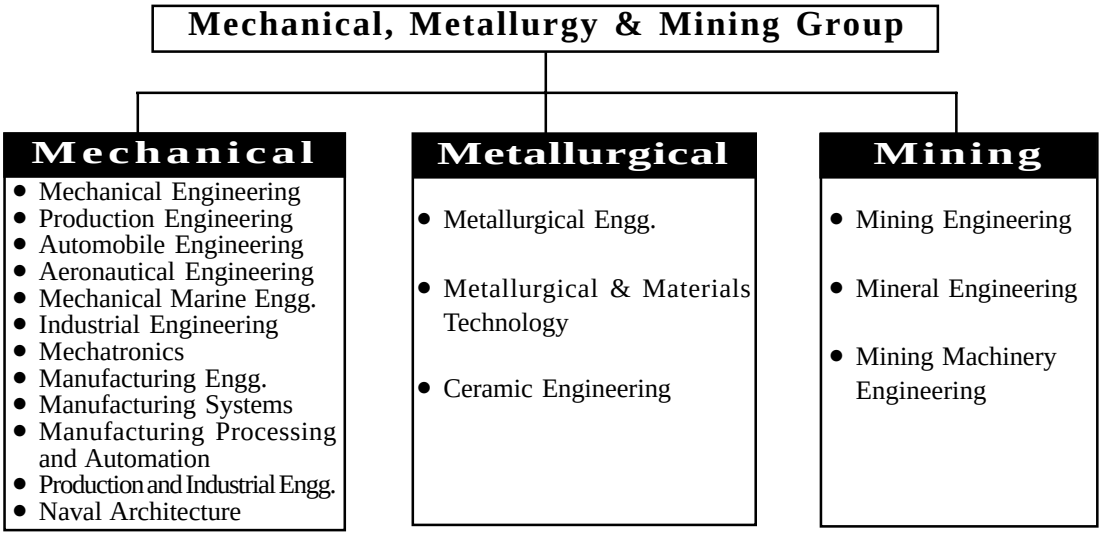
MECHANICAL, METALLURGY AND MINING GROUP

This is a multi faceted group. It offers ample scope for learning to students with different skills, aptitudes and attitudes. The students who choose a course is this group gain competencies and capabilities to meet the requirements of almost all types of industries like Manufacturing, Processing, Mining, Metallurgy, service etc.

The Broad categorisation of courses under this group are as depicted in the block diagram given below:-



The courses under the category deal with the resources available under the sun. Mining Metallurgy related courses provide inputs to learners in dealing with the natural resources from their crudest to finest form as may be required for various applications.

Mechanical, Manufacturing/Production / Automobile / Aeronautical Engineering courses provide specific specialised knowledge or skills to students, equipping them with technical competence and capability in making use of natural resources, with relevant energy conversion techniques to develop products / services for further industrial growth.

Industrial Engineering / Production Management courses offer inputs that benefit manufacturing, processing and service industries, integrating the human and physical resources with better understanding of the behaviour of both, at various stages and levels of processing with the advancements and developments taking place in the managerial world.

MECHANICAL ENGINEERING (MEC)

MEC is the largest branch of engineering concerned with the production of all types of machinery and all aspects of its mechanism and functioning. It deals with design, development, construction, production, installation, operation of mechanical systems in industries including power plants, transport equipment, machine tool industry, air-conditioning and refrigeration, internal combustion engines, steam plants, boiler operations etc.

Mechanical engineers are responsible for maintenance, repair, and research work. They are responsible for developing new processes and applications for manufacturing purposes or conducting experiments on the use of new materials.

JOB OPPORTUNITIES

Mechanical engineers can get absorbed in almost any industry, in the private or public sector. A few of them are listed below:

- Govt. departments of Posts and Telegraphs, Defence, PWD, Aeronautical, Agriculture, Automobile, Chemical plants, Railways, Steel plants, Power plants, Computer manufacturing industries.
- Refrigeration and Air-conditioning plants.
- Robotics.
- Computer Integrated Manufacturing (CIM).
- Computer Aided Manufacturing (CAM).
- Plastics & Polymer industries.
- Textile, Rubber, and Chemical industries.

With many automobile industries, likely to be established and with boom predicted for the manufacturing and service sector in the next 20 years, there are quite a good number of opportunities available. In the next two decades, there is every likelihood of many automobile industries coming up. Also, a boom in the manufacturing and service sector is predicted. In the circumstances. There is scope for quite a good number of opportunities being available for mechanical engineers, diploma holders and craftsmen.

PRODUCTION (INDUSTRIAL PRODUCTION) ENGINEERING (IPE)

IPE provides skills in the integrated design and efficient planning of operations to achieve higher productivity in manufacturing and production in industries. This discipline has been given a nationally recognised status which has enhanced the career development and create opportunity to continue the studies upto post graduation level

Graduates in IPE are involved in:

- Handling engineering issues relating to planning, managing and maintaining production methods and process.
- Design, installation of integrated systems for men, materials, equipment, processes for increasing productivity.
- Planning of activities that produce quality products / services that are economically viable and technically feasible.

JOB OPPORTUNITIES

Graduates in IPE acquiring broad-based knowlegde in the fields of production and industrial engineering have opportunities in:

- All types of engineering and manufacturing industries.
- Opportunities are available in a wide variety of industries and companies, large or small, within India, UK and other countries.
- Industries involved in; materials handling, operating methods and quality control.
- Industries with flexibility and possibility to work in various departments as production engineers / managers or performing other technical roles as system engineers, industrial engineers.
- Banks and financial institutions handling technical aspects of project appraisals.
- One can also move into commercial posts, such as sales and marketing executives, general management professionals or take up self employment or contract work.
- Become an entrepreneur as a worthy career option.

MECHANICAL (MECHATRONICS) (MCT)

MCT is a course devised as a multi disciplinary fusion of various branches of engineering and as a synergetic combination of precision mechanical engineering, electronic controls and computing technologies to enhance the performance of products, systems and processes.

The knowledge and competence gained by the students after the completion of the course make them comfortable in various areas such as

- Handling mechanical systems incorporating electronics, computers and information technology.
- Integrating inter disciplinary technologies.
- Design, development, and maintenance of robot systems, CAD-CAM, flexible manufacturing systems (FMS) and Computer Integrated Manufacturing (CIM).
- Gain expertise in building of electronic circuits, good storing techniques and computer proficiency.

MCT comprise basic foundation subjects of engineering, mechanical design & drafting, materials technology, programming logic controllers, computer aided design & drafting, robotics, industrial automation etc.

JOB OPPORTUNITIES

It is an exciting & rapidly growing area of engineering with excellent career opportunities. Graduates in MCT have wide range of job potential in

- Mechanical Engineering industries relating to Thermal, Production, Process, Automation etc.
- Industries dealing with design, manufacture, installation and maintenance of mechanical and electronics combined systems.
- Industries, R&D units involved in Robotics.
- Any industry using CAD-CAM applications.
- Industries involved in industrial automation.
- Computer Integrated manufacturing units.
- Industries having interface with mechanical systems & environment using both software and hardware.

AERONAUTICAL ENGINEERING (ANE)

One who takes to this branch of Engineering can pride himself over the choice of his role model, who is none other than our former president, ***Hon'ble Dr. Abdul Kalam.*** *ANE is one of the technologically advanced branches of engineering concerned with the design, manufacturing, testing, operations, and maintenance of aircraft and its components. The main thrust in this area is on design and development extending to space and satellite research.*

The curriculum at B.Tech level covers fundamentals of propulsion, electronics, autonomic control guidance, theory of aero dynamics, structural analysis, material science and fluid dynamics.

The course inputs intend to provide skills in Design, Construction and Testing of commercial and Defence Aircraft, Missiles, Spacecraft, Aero dynamics, Acoustics, Thermo dynamics that focus on systems that operate in the Earth's atmosphere and astronautics.

JOB OPPORTUNITIES

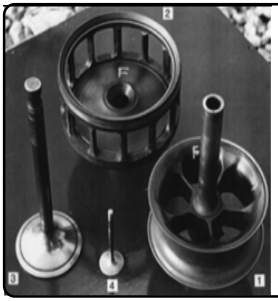
Career path after the completion of ANE takes one on an exciting journey through widely varying disciplines in Aerospace engineering, Design & Development, Testing and Manufacturing of commercial and Military Aircraft, Missiles and Spacecraft, Development of new technologies in commercial aviation, Defence systems, and Space Exploration. Companies & Government agencies in the aeronautic field employs the graduate engineers as

- Aerospace, Mechanical and Electrical engineers.
- Propulsion, guidance, navigation and control Scientists, Technologists / Technicians.
- Aircraft structural, material engineers.
- Electronics (including Radar) engineers in military / civilian aircraft.
- Aircraft engineers.
- Missile systems engineers.

The aeronautical engineers find placements in

- Airlines, both Government and Private.
- Aircraft manufacturing and maintenance industries.
- HAL, DRDO, Air India, Indian Airlines, ISRO, R&D works in Ministry of Defence, Civil Aviation, Defence Labs, Civil Aviation departments.
- R&D works in defence laboratories, space research, missile technologies etc., in Civil Aviation departments.

AUTOMOBILE ENGINEERING (AUT)



Till date, the greatest invention of mankind has been reckoned as the invention of wheel. Naturally, which none other than Automobile Engineering might immediately fuel imaginative and curious minds to further inventions and applications? Automobile Engineering is concerned with Design, development, manufacture and maintenance of automobiles, demand for AUT is growing with the expansion of automobile industry and is poised for phenomenal increase in the coming decades.

AUT broadly covers

- Construction, calculation and testing, priming work of automobiles. Fabrication and observation of the functionality of vehicles for street and rails.
- Quality / standard engineers for developing, maintaining pollution free, fuel efficient engineers making them efficient.
- Develop car bodies and build ups with aggregates of engines, clutches, gears, steering etc.
- Design vehicles as per the postulation of aero dynamics and stylistics.
- Manufacture systems with criteria of functionality, safety and dreading of resources and economy.
- Design of spares for commercial and special vehicles.

JOB OPPORTUNITIES

Graduates of AUT with broad based knowledge in general mechanical engineering and specialised knowledge in automobiles have good opportunities in:

- Vehicle / Automobile manufacturing industries.
- Assembling Plants in Maintenance and Service Stations.
- Development, Maintenance engineers in private transport companies.
- Defence Services.
- Transport undertakings.
- Insurance companies as value assessors.
- Setting up their own automobile garages or maintenance workshops.
- Turning themselves as entrepreneurs in manufacturing, service, spares etc.

METALLURGICAL ENGINEERING (MET)

This course provides inputs in knowing about metals and their extensive applications in various types of industries. The contents of the course provide adequate inputs starting from, extraction of metals, their processing, manufacture, production of variety of products etc.

MET provides the engineers in the discipline with:

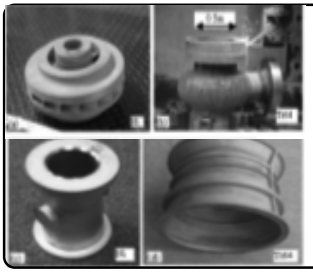
- Adequate knowledge and skills relating to materials, metallurgy and material sciences.
- Skills in developing, manipulating the mechanical, thermal and chemical properties of metals and their alloys for different applications.

JOB OPPORTUNITIES

The metallurgical engineers can look for jobs in any industry that deals with metals, alloys and composite materials like

- Ferrous and non-ferrous metal industries involved in manufacturing, processing testing and utilisation.
- Defence and Research Laboratories.
- Multi farious utility product manufacturing units.
- Foundries both ferrous and non-ferrous.
- Machine tool, Tool design, Tooling industries.
- Ordinance factories, Aeronautic engineering, space research organisations etc.

METALLURGY & MATERIALS TECHNOLOGY (MMT)



MMT is an extended course of Metallurgy with specialisation of materials technology. The course contents include physical metallurgy, extractive metallurgy, mineral processing.

Metallurgical Material Engineers after their graduation are involved in:

- Development processing and testing of the materials used to create a range of products from computer chips and television screens.
- Working with metals, ceramics, plastics, semi conductors and composites to create new materials that meet certain mechanical electrical and chemical requirements.
- The selection of materials for new applications in every industry.
- Developing materials, components as per the requirements of the industry.

JOB OPPORTUNITIES

Metallurgical Materials engineers are employed in industries as

- Material Engineers involved in the development of processes, technologies using new materials or improving the existing materials.
- Specialists developing new materials, processes in steel, ceramic, composite industries.
- Metallurgical industries and industries dealing with metallic & non metallic materials.

MECHANICAL MARINE ENGINEERING (MMC)

MMC is a field of engineering involving construction, repair and maintenance of sailing vessels. The marine engineers will have to continuously strive for the improvement of the efficiency of the conventional & latest steam engines, steam turbines, diesel engines, gas turbines, nuclear propulsion systems etc. They need to be conversant with new technologies such as super conductivity, magnetic hydrodynamics, fuel cells, ocean thermal energy etc.

Job functions of marine engineers include:-

- Design, manufacture and operation of ship engines and machinery.
- Supervision of engine crew involved in operating the ship machinery.

The course provides knowledge of fairly high standards in fundamental sciences, specialised knowledge in marine engineering which include basic tools, theory & practice of power house operations, testing & organisation of power plants etc. Basic knowledge in social sciences and humanity is also provided in this course.

JOB OPPORTUNITIES

The Graduates of this course find job opportunities in marine engineering-related services:-

- As engineers in Navy, Merchant Navy.
- Engineers and technologists in Ship building Industry.
- In Ship repair workshops.
- In Naval & Marine Engineering Research organisations.
- In Industries involved in the manufacture of steam turbines, marine diesel engines, gas turbine power.
- In Industries dealing with Gas generators, ship cranes, material handling equipment.
- In Shipping Companies, shipbuilding and repair yards.

NAVAL ARCHITECTURE (NVA)

NVA intends to equip the students with well-founded knowledge and understanding of naval architecture with reference to

- *Ship design, performance, production structure and propulsion.*
- *Design, construction, repair and operation of various types of ships and boats.*
- *Ocean engineering dealing with marine structures and systems including offshore oil and gas, renewable energy and ocean resources.*
- *Developments in marine vehicles like supertankers, sailing yachts, fast ferries, offshore oil platforms etc.*

JOB OPPORTUNITIES

The graduates in NVA are in demand in a wide variety of marine industries worldwide. There are ample career options available to them in ships, marine vessels Management and commerce fields etc.

Filler

MARINE ENGINEERING (ME)

It is a challenging job with much scope calling for self dependence, ME calls for innovative and crisis management skills.

Marine Engineers are responsible for the safe running of ship as well as proper maintenance of all the machinery of the ship. They will be overall incharge of the engine and its crew who ensure the safety of the marine body. They also see that it meets the requisite standards. With the entry of Electronics navigation, marine engineering has undergone a sea change as it has become smoother and more systematic.

The responsibilities of a Marine Engineer being large, the aspirant is expected to have organising ability, team spirit, maintain a cool temperament and cope with pressure. The foremost quality is the ability to handle a critical and unforeseen situation, possess good communication skills, physical fitness and above all, liking for sea.

The course also includes in-depth coverage of various allied engineering topics e.g. Mechanics of Machines, Mechanics of Materials, Advanced Mathematics, Advanced Computer Science, Electronics, Fluid Mechanics etc., so that the candidate after successful completion of the course would be endowed with adequate knowledge to pursue the development and research work in his chosen area, if he so desires.

There are, however, not many colleges which offer this specialised field / area of Engineering. In Andhra Pradesh, the course is offered by Andhra University, Dept. of Marine Engineering and also by Praveenya Institute of Marine Engineering & Maritime Studies, Visakhapatnam.

Admission to the above course is basically on the successful completion of 10+2 with Mathematics, Physics and Chemistry as main subjects, which may be followed by individual screening test by the respective colleges and tests communication skills and physical fitness.

JOB OPPORTUNITIES

A Marine Engineer has a number of options after successful completion of the cause. Marine Engineers primarily work in the Indian Merchant Navy, which mainly comprises of tankers, liners, passenger vehicles, ore carriers and other types of specialised ships. These Merchant Navy ships are operated by public sector as well as private sector shipping companies. One has diversified options to select the ship one wants to join. A Marine Engineer's entry level post is Junior Engineer. The initial salary is around Rs.25,000 to Rs.30,000 per month.

An added attraction in this particular area of engineering is that by virtue of travelling for more than six months outside Indian borders, the marine engineer obtains NRI status and is exempted from taxes to which otherwise an Indian engineer is subjected to.

MINING ENGINEERING (MIN)

MIN is an exciting field of engineering and quite diversified as it includes apart from general engineering the professional mining subjects like, drilling, blasting of material, handling, rock mechanics, mine health, safety, mine ventilation, mine cost engineering, ore reserve analysis, operations analysis, mine planning, mineral processing, solution mining, including microbial assessed extraction method which is a new area of interest integrated into the curriculum.

The course coverage is a blend of basic sciences with theoretical & practical training in different aspects of mining engineering, metallurgy and geology

Functions of a mining engineer is

- By applying the knowledge of Engineering fundamentals and improved technology to recover natural resources.
- Extraction of metal and non-metal ores of all kinds.
- Extraction of solid fuels and energy sources such as coal and nuclear material.
- Utilisation of earth's constructions.
- Constructing developing roads, rail roads, tunnels and underground chambers and handling hazardous waste materials.

JOB OPPORTUNITIES

The mining engineers are versatile and very much in demand. With adequate inputs in the curriculum in ecological and environmental planning, the mining engineers are preferred in many areas.

A few of them are listed below:-

- Preservation and enhancement of natural mineral resources.
- Managerial functions in Mining, Geology-related industries.
- General engineering operations, sales and management.
- Public Sector undertakings connected to mining-related activities.
- State and Central Governments' mining departments.
- Mines and Mineral Development Corporations.
- Overseas jobs in Australia, USA, South Africa etc.
- Coal handling industries.
- Manufacture, maintenance of mining equipment & machinery.
- Gold extraction and processing industries.