

$$\alpha^0 = 1 [a_0]$$

$$\arcsin(z)$$

ENGINEERING ECONOMICS

$$x_{n+1} =$$



What is Economics all about???

**Unlimited
wants**

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graph TD; A[Unlimited wants] --> C[SCARCITY]; B[Limited resources] --> C; C --> D[Choices]; D --> E[WHAT to produce]; D --> F[HOW to produce]; D --> G[FOR WHOM to produce];
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A flowchart illustrating the economic problem. At the top, two blue arrows point downwards. The left arrow is labeled 'Unlimited wants' and the right arrow is labeled 'Limited resources'. Both arrows point to a central red rectangular box labeled 'SCARCITY'. From the bottom of the 'SCARCITY' box, a red arrow points down to a yellow rectangular box labeled 'Choices'. From the bottom of the 'Choices' box, a red line branches out into three separate red arrows, each pointing down to a light orange rectangular box. The three boxes are labeled 'WHAT to produce', 'HOW to produce', and 'FOR WHOM to produce'.

**Limited
resources**

SCARCITY

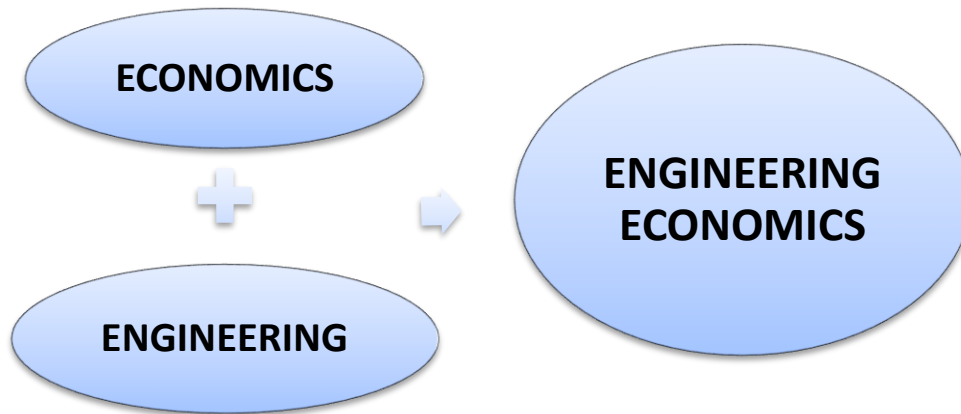
Choices

**WHAT
to produce**

**HOW
to produce**

**FOR WHOM
to produce**

ENGINEERING ECONOMICS



What is Economics?

Economics is the study of the use of scarce resources to satisfy unlimited human wants.

What is Engineering?

Engineering is the application of scientific, economic, social and practical knowledge in order to design, build and maintain structures, machines, devices, systems and materials.

**WHY DO ENGINEERS NEED TO
STUDY ECONOMICS??**

- **Engineering is an application of science used in development and improvement of products and services = benefit to the society.**
- **Improves efficiency and productivity = subject matter of Economics.**
- **Strategic Decision Making**
- **Technical Feasibility + Economic Viability**
- **Engineers also confront PROBLEM OF CHOICE.**

- **Engineering activities are performed in certain Economic environment.**
- **Need for cost-effective upgraded technology as a result of increasing competition.**
- **Forecasting fluctuations in business cycles.**
- **Environmental Concerns.**
- **Some other topics that are addressed in Engineering Economics are Inflation, Uncertainty, Replacement, Depreciation, Resource Depletion, Accounting, Cost Estimation and Capital Financing.**

LINKAGES WITH THE EMERGING MARKET ECONOMIES



- **Understanding of economic principles and their application in engineering activities is crucial for engineers of a developing country like India, which is reeling under low labor productivity.**
- **Some of the basic characteristics of the Indian economy are significantly large informal sector, inaccessible and remote rural areas, subsistence agriculture, etc.**
- **Appropriate technology may improve these problems to a certain extent.**

- **India mainly relied on import of technology from those countries which were labor scarce and capital surplus. Though India is a labor surplus country, application of these technologies has provided employment to highly skilled small group of workers which has ultimately resulted into large-scale unemployment and widened the gap between haves and have-nots.**
- **A technology can only be effective in an economy when it is able to develop forward, backward and lateral linkages with the local resources.**
- **With the growing environmental concerns, developing ecofriendly technologies is a challenge before engineers.**
- **Engineering a response to unprecedented global challenges.**

SYLLABUS

1.	Introduction: Nature and significance of economics, Goods and Utility, Basic Concept of Demand and Supply, Elasticity of Demand-Price elasticity of Demand, Cross elasticity of Demand, Production - Production Function, Production Process and Factors of Production, Market – Introduction to Monopoly, Perfect Competition, Oligopoly and Monopolistic Competition, Cost Concepts- Opportunity Cost, Total Cost, Average Cost; Marginal Cost; Life Cycle cost, Sunk Cost; Preparation of Cost Sheet Profit Maximisation- numerical problem.
2.	Money- its evaluation and function, Bank- Commercial Bank and Central Bank and brief idea about function of banking system:. Tax and Subsidy, Type of Tax- Direct and Indirect, Monetary and fiscal policy, Inflation and Business cycle, International trade, terms of Trade, Gain from International Trade, Free Trade vs. Protection, Dumping, Balance of Payment.
3.	Role of Science, Engineering and Technology in Economic Development: Seven salient Feature of the Indian Economy; Inclusive Growth; relevance for the Indian Economy; Globalisation& opening up of the Indian Economy; GDP- definition and Its measurement; How knowledge of engineering and ology may be used to improve life at slum; Green Revolution and White revolution. Reasons for their success and can we replicate them. Appropriate Technology & Sustainable Development. Entrepreneurship: Macro environment for promotion of entrepreneurship: How environment has changed after advent of IT and Globalisation.
4.	Elementary Economic Analysis: Interest formulas and their Applications; Calculations of economic equivalence, Bases for Comparison of Alternatives: Present Worth Method, Future worth method, Annual equivalent, Internal Rate of Return; Business Risk; Factors which should be taken care while deciding price of the product in the market.

SCOPE OF ECONOMICS

Resources to exchange economic goods are scarce. At the same time, these scarce resources have alternative uses. They are capable to exchange a lot of economic goods.

As the needs differ in their intensity, some wants are more urgent in comparison to others. A rational human being, therefore, tries to satisfy maximum of his wants from available resources on the basis of his intensity for consumption.

In order to satisfy maximum wants, he always tries to maximize the benefits he receives from a particular good to the sacrifices he makes to acquire that good.

Scope of Economics revolves around activities of a rational human being as well as production, distribution and consumption of economic goods.

DEFINITIONS OF ECONOMICS

Wealth Definition (Adam Smith)

Wealth creation and its accumulation are very important for both individual and country. He advocated for laissez-faire economy where the market will have free hand to operate. Producers will produce if the goods are in demand and consumers will purchase those goods that are available in the market.

Material Welfare Definition (Alfred Marshall)

- Study of mankind in the ordinary business of life.
- Production and consumption of material goods.
- Discusses welfare rendered by material goods.

Development and Growth Definition (Samuleson)

- Economics deals with efficient allocation of limited resources.
- It is concerned with the allocation of its limited resources in a manner, which will ultimately lead to economic development of an economy.
- Economics is also concerned with an equitable distribution of fruits of economic development among all segments of the society.

NATURE AND APPROACH OF ECONOMICS

There is debate among several scholars over nature and approach of Economics. Regarding nature, it is debated that whether it is a subject of science or social science or both and regarding approach, it is normative or positive.

Economics as a Science

Economics is a science because it is a systematic body of knowledge. Again, variables in Economics are liable to quantify in terms of money. It has a proper methodology to discuss.

Economics as Social Science

Economists differ in their approach and opinion on any economic issue as a subject of social science. Economic behavior of a human being is highly unpredictable and value of the measuring scale of Economics, money does not always remain same.

Normative approach of Economics attempts to prescribe what ought to be done. For this, we need to use a set of value judgments. Thus, normative economics is based on ethical, moral, philosophical and religious beliefs of the people.

Positive approach of Economics involves explanation and prediction of economic behavior as it is and not what it ought to be. Role of economists in this approach is to say what consequences could follow of certain action, but it cannot judge the desirability of ends.

Economics

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graph TD; A[Economics] --> B[Microeconomics]; A --> C[Macroeconomics]
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The diagram is a simple tree structure. At the top is a box labeled 'Economics'. A vertical line descends from the bottom center of this box to a horizontal line. From the left end of this horizontal line, an arrow points down to a box labeled 'Microeconomics'. From the right end of the horizontal line, an arrow points down to a box labeled 'Macroeconomics'. All boxes have a black border and rounded corners. The text is in a bold, green, sans-serif font.

Microeconomics

Macroeconomics

SUBJECT MATTER OF ECONOMICS

MICROECONOMICS

- deals with economic behavior of small entity; it may be a consumer or a firm.
- Economic decision taken under Microeconomics is under control of the individual regarding whom the 'decision has been taken as, how much has to be purchased' is under control of the customer

MACROECONOMICS

- deals with the study of the aggregate or average covering the entire economy, viz. national income, aggregate production, general price level, etc.
- All of us are affected by Macroeconomic decisions but it is not under control of any one of us as, we all are affected by Income Tax Policy of the Government of India but none of us can change it according to convenience.