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HANDOUT

ECO302

Principles of Microeconomics

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ECO302

Principles of Microeconomics

STUDY HANDOUT

A complete topic-wise study handout for ECO302 Principles of Microeconomics, prepared from the course video lectures. Covers scarcity, supply and demand, elasticity, consumer behaviour, production and costs, market structures, factor markets and market failures - with definitions, explanations, worked examples and exam pointers.

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Lecture 1: The Circular Flow of Economic Activity

Key terms: circular flow, factor markets, product markets, injections, leakages

The circular flow model shows how money, goods and factors of production move between households and firms. Households supply factors of production (labour, capital, land) to firms through factor markets and receive wages, rent, interest and profit in return. Firms supply goods and services to households through product markets and receive revenue.

- Injections into the flow: investment, government spending and exports. Leakages: saving, taxes and imports.
- In equilibrium, injections equal leakages. If leakages exceed injections, economic activity contracts.
- The model shows the interdependence of all economic actors - a foundation for both micro and macro analysis.

EXAM POINTER: Draw the two-sector circular flow diagram and explain the difference between real flows and money flows.

Lecture 2: Introduction to Economics and Scarcity

Key terms: scarcity, microeconomics, macroeconomics, positive vs normative, factors of production

Economics is the study of how societies use scarce resources to produce valuable goods and services and distribute them among different people. The central problem of economics is scarcity: human wants are unlimited but resources - land, labour, capital and entrepreneurship - are limited. Because of scarcity, every choice involves a trade-off.

- Microeconomics studies the behaviour of individual decision-making units: households, firms and individual markets. Macroeconomics studies the economy as a whole: inflation, unemployment and growth.
- Positive economics describes what is (facts); normative economics prescribes what ought to be (value judgments).
- Resources are classified as land (natural resources), labour (human effort), capital (machines, buildings) and entrepreneurship (risk-taking organisation).

EXAM POINTER: Define scarcity and explain why it forces every economic agent to make choices. This is the opening question of almost every ECO302 exam.

Lecture 3: Opportunity Cost and the Production Possibilities Frontier

Key terms: opportunity cost, PPF, efficiency, economic growth, comparative advantage

Opportunity cost is the value of the next-best alternative forgone when a choice is made. If you spend an hour studying economics, the opportunity cost is whatever else you could have done with that hour. Rational decision-makers compare marginal benefit with marginal cost.

The Production Possibilities Frontier (PPF) shows the maximum combinations of two goods an economy can produce when all resources are fully and efficiently employed. Points on the curve are efficient; points inside are inefficient (unemployment); points outside are unattainable with current resources.

- The PPF is bowed outward (concave) because of increasing opportunity cost: resources are not equally suited to producing both goods.
- Economic growth shifts the PPF outward; it comes from more resources, better technology or improved skills.
- Absolute advantage means producing more with the same resources; comparative advantage means producing at a lower opportunity cost. Trade is based on comparative advantage.

EXAM POINTER: Draw and explain a PPF. Show the effect of (a) unemployment, (b) technological improvement in one good, (c) economic growth.

Lecture 4: Demand: Law, Schedule, Curve and Shifts

Key terms: law of demand, ceteris paribus, substitution effect, income effect, normal vs inferior goods

Demand is the quantity of a good that buyers are willing and able to purchase at various prices, holding other factors constant (*ceteris paribus*). The law of demand states that, other things equal, quantity demanded falls as price rises - the demand curve slopes downward. Two reasons: the substitution effect (buy cheaper alternatives) and the income effect (lower price raises real purchasing power).

Determinants that shift the demand curve

- Income: for a normal good, higher income shifts demand right; for an inferior good, it shifts demand left.
- Prices of related goods: substitutes (tea/coffee) - a rise in the price of one raises demand for the other; complements (cars/petrol) - a rise in the price of one lowers demand for the other.
- Tastes and preferences, expectations of future prices/income, number of buyers, and advertising.

EXAM POINTER: Distinguish a movement along the demand curve (change in quantity demanded, caused by price) from a shift of the curve (change in demand, caused by non-price factors).

Lecture 5: Supply: Law, Schedule, Curve and Shifts

Key terms: law of supply, input prices, technology, taxes, subsidies

Supply is the quantity of a good that sellers are willing and able to offer at various prices. The law of supply states that quantity supplied rises as price rises - the supply curve slopes upward, because higher prices make production more profitable and attract more sellers.

Determinants that shift the supply curve

- Input prices: higher wages or raw-material costs shift supply left (decrease).
- Technology: improvement shifts supply right (increase).
- Expectations, number of sellers, government taxes (shift left) and subsidies (shift right).

EXAM POINTER: If the government imposes a per-unit tax on sellers, the supply curve shifts up/left by the amount of the tax. Be ready to draw this.

Lecture 6: Market Equilibrium and Changes in Equilibrium

Key terms: equilibrium price, surplus, shortage, shifts vs movements

Market equilibrium occurs where quantity demanded equals quantity supplied - the intersection of the demand and supply curves. The equilibrium price (market-clearing price) is the only price at which buyers' plans match sellers' plans. At a higher price there is a surplus (excess supply); at a lower price there is a shortage (excess demand). Prices adjust to eliminate surpluses and shortages.

- Increase in demand (rightward shift): equilibrium price and quantity both rise.
- Decrease in demand: price and quantity both fall.
- Increase in supply: price falls, quantity rises. Decrease in supply: price rises, quantity falls.
- When both curves shift, the effect on one variable is certain and on the other is ambiguous - work it out with a diagram.

EXAM POINTER: Practice the four single-shift cases and the double-shift ambiguity. Examiners love asking: demand rises and supply falls - what happens to price and quantity? (Price definitely rises; quantity is ambiguous.)

Lecture 7: Elasticity of Demand

Key terms: law of demand, ceteris paribus, substitution effect, income effect, normal vs inferior goods

Price elasticity of demand (E_d) measures how responsive quantity demanded is to a change in price: $E_d = (\% \text{ change in quantity demanded}) / (\% \text{ change in price})$. Because of the law of demand the value is negative; we usually quote its absolute value. Demand is elastic if $E_d > 1$, inelastic if $E_d < 1$, and unit elastic if $E_d = 1$.

- Determinants of elasticity: availability of close substitutes (more substitutes = more elastic), necessity vs luxury (necessities inelastic), proportion of income spent, and time horizon (more elastic in the long run).
- Total revenue test: if demand is elastic, a price cut raises total revenue; if inelastic, a price cut lowers total revenue.
- Perfectly elastic demand is horizontal ($E_d = \text{infinity}$); perfectly inelastic demand is vertical ($E_d = 0$).

EXAM POINTER: Numericals: compute elasticity using the midpoint formula and classify demand. Also relate elasticity to total revenue - a guaranteed exam question.

Lecture 8: Elasticity of Supply and Income/Cross Elasticities

Key terms: law of supply, input prices, technology, taxes, subsidies

Price elasticity of supply (E_s) = $(\% \text{ change in quantity supplied}) / (\% \text{ change in price})$. Supply is more elastic when producers can easily expand output - typically more elastic in the long run than the short run, because firms need time to build capacity.

- Income elasticity of demand = $(\% \text{ change in quantity}) / (\% \text{ change in income})$. Positive for normal goods, negative for inferior goods; greater than 1 for luxuries.
- Cross elasticity of demand = $(\% \text{ change in quantity of X}) / (\% \text{ change in price of Y})$. Positive for substitutes, negative for complements, near zero for unrelated goods.
- Governments use elasticity estimates to predict tax revenue: taxing inelastically-demanded goods (cigarettes, petrol) raises more revenue.

Lecture 9: Consumer Behaviour: Utility and Marginal Utility

Key terms: utility, marginal utility, diminishing marginal utility, equi-marginal principle

Utility is the satisfaction a consumer gets from consuming a good. Total utility rises with consumption but marginal utility - the extra satisfaction from one more unit - diminishes. This is the law of diminishing marginal utility: the first slice of pizza gives more satisfaction than the fifth.

A rational consumer maximises utility subject to the budget constraint by allocating spending so that the marginal utility per rupee is equal across all goods: $MU_x/P_x = MU_y/P_y$. If $MU_x/P_x >$

MU_y/P_y , the consumer should buy more X and less Y. This is the equi-marginal principle.

EXAM POINTER: Numerical: given a utility schedule and prices, find the utility-maximising bundle. Set MU per rupee equal and check the budget is exhausted.

Lecture 10: Indifference Curves and the Budget Line

Key terms: indifference curve, MRS, budget line, consumer equilibrium

An indifference curve shows all combinations of two goods that give the consumer the same level of utility. Indifference curves slope downward (more of one good means less of the other to stay equally happy), are convex to the origin (diminishing marginal rate of substitution), and never cross.

The budget line shows all affordable combinations given income and prices: $P_x \cdot X + P_y \cdot Y = \text{Income}$. Its slope is $-P_x/P_y$. Consumer equilibrium is at the tangency point where the budget line just touches the highest attainable indifference curve - where $MRS = P_x/P_y$.

- A rise in income shifts the budget line outward parallel; a fall in the price of X makes it flatter (pivots out on the X-axis).
- The marginal rate of substitution (MRS) is the rate at which the consumer will trade Y for X while staying equally satisfied; it diminishes along the curve.

Lecture 11: Deriving Demand and Consumer/Producer Surplus

Key terms: law of demand, ceteris paribus, substitution effect, income effect, normal vs inferior goods

The demand curve can be derived from indifference-curve analysis: as the price of X falls, the budget line pivots outward and the tangency moves to a higher indifference curve with more X consumed. Plotting price against quantity gives the downward-sloping demand curve. The price-consumption curve traces these equilibria.

Consumer surplus is the difference between what consumers are willing to pay and what they actually pay - the area below the demand curve and above the price. Producer surplus is the difference between the market price and the minimum price producers would accept - the area above the supply curve and below the price. Together they measure the gains from trade; competitive equilibrium maximises their sum (allocative efficiency).

Lecture 12: Choice Under Uncertainty

Key terms: expected value, risk aversion, diversification, moral hazard, adverse selection

Many decisions involve risk. Expected value is the probability-weighted average of outcomes. A risk-averse person prefers a certain outcome to a gamble with the same expected value; a risk-neutral person is indifferent; a risk-lover prefers the gamble. Diminishing marginal utility of

income explains risk aversion: losing Rs. 1,000 hurts more than gaining Rs. 1,000 pleases.

- Insurance works by pooling risks: the law of large numbers makes average losses predictable even when individual losses are not.
- Diversification reduces risk by spreading investments across assets whose returns are not perfectly correlated.
- Moral hazard: being insured may make people take more risks. Adverse selection: those most likely to claim are most eager to buy insurance.

Lecture 13: Production: Inputs, Total/Marginal/Average Product

Key terms: production function, TP/MP/AP, diminishing marginal returns, stages of production

Production is the transformation of inputs (factors of production) into output. In the short run at least one input (usually capital) is fixed; in the long run all inputs are variable. The production function $Q = f(L, K)$ shows the maximum output from given inputs.

- Total product (TP) is total output; marginal product (MP) is the extra output from one more unit of input; average product (AP) is output per unit of input.
- Law of diminishing marginal returns: as more of a variable input is added to fixed inputs, its marginal product eventually falls.
- MP curve cuts the AP curve at AP's maximum: when $MP > AP$, AP rises; when $MP < AP$, AP falls.

EXAM POINTER: Draw the TP, MP and AP curves and explain the three stages of production. Stage II (MP positive but falling, AP falling) is the rational stage.

Lecture 14: Costs in the Short Run

Key terms: TFC, TVC, MC, AFC/AVC/ATC, shutdown point

Total cost = total fixed cost + total variable cost ($TC = TFC + TVC$). Fixed costs do not change with output (rent); variable costs do (raw materials, hourly wages). Marginal cost (MC) is the extra cost of one more unit: $MC = \text{change in } TC / \text{change in } Q$.

- Average fixed cost (AFC) always falls as output rises. Average variable cost (AVC) and average total cost (ATC) are U-shaped because of diminishing returns.
- The MC curve cuts AVC and ATC at their minimum points: when MC is below average, average falls; when MC is above, average rises.
- In the short run the firm shuts down if price falls below minimum AVC (it cannot even cover variable costs).

EXAM POINTER: Draw the full family of short-run cost curves (AFC, AVC, ATC, MC) and explain their shapes and intersections - a classic diagram question.

Lecture 15: Costs in the Long Run and Economies of Scale

Key terms: LRAC, economies of scale, diseconomies, minimum efficient scale

In the long run all inputs are variable, so there are no fixed costs. The long-run average cost (LRAC) curve is the envelope of short-run ATC curves - it shows the lowest cost of producing each output level when the firm can choose its optimal plant size. It is typically U-shaped.

- Economies of scale: LRAC falls as output rises - due to specialisation, bulk buying, better technology.
- Diseconomies of scale: LRAC rises at very large outputs - due to management difficulties and bureaucracy.
- Constant returns to scale: LRAC is flat. Minimum efficient scale is the smallest output at which LRAC is minimised.

Lecture 16: Perfect Competition: Characteristics and the Firm

Key terms: price taker, $P=MR=MC$, profit, shutdown rule

Perfect competition has four features: many small buyers and sellers, a homogeneous product, free entry and exit, and perfect information. Each firm is a price taker: it faces a horizontal demand curve at the market price and can sell any quantity at that price.

The competitive firm maximises profit where marginal revenue equals marginal cost ($MR = MC$). Since $P = MR$ for a price taker, the rule is $P = MC$. The firm's short-run supply curve is the rising portion of its MC curve above minimum AVC.

- Profit = $(P - ATC) \times Q$. If $P > ATC$ the firm earns economic profit; if $P = ATC$ it breaks even; if $AVC < P < ATC$ it produces at a loss in the short run; if $P < AVC$ it shuts down.
- The shutdown point is minimum AVC; the break-even point is minimum ATC.

Lecture 17: Perfect Competition: Long-Run Equilibrium and Efficiency

Key terms: free entry and exit, zero economic profit, normal profit, efficiency

In the long run, free entry and exit drive economic profit to zero. If profits exist, new firms enter, supply rises and price falls; if losses exist, firms exit, supply falls and price rises. Long-run equilibrium: $P = MR = MC = \text{minimum ATC}$. Firms produce at the lowest possible cost and earn only normal profit.

- Perfect competition is efficient: allocative efficiency ($P = MC$, producing what consumers value most) and productive efficiency (minimum ATC).
- Consumer and producer surplus are maximised; there is no deadweight loss.
- Limitation: perfectly competitive markets may under-provide public goods and ignore externalities.

EXAM POINTER: Explain why long-run equilibrium in perfect competition occurs at minimum ATC with zero economic profit. Use entry/exit logic.

Lecture 18: Monopoly: Sources, Demand and Profit Maximisation

Key terms: law of demand, ceteris paribus, substitution effect, income effect, normal vs inferior goods

A monopoly is a single seller of a product with no close substitutes, protected by barriers to entry: control of a key resource, legal barriers (patents, licences), or natural monopoly (huge fixed costs make one firm cheapest, e.g. utilities). The monopolist faces the downward-sloping market demand curve.

For a monopolist, marginal revenue is less than price (to sell more it must cut price on all units), so the MR curve lies below demand. Profit is maximised at $MR = MC$, and the monopolist charges the price read off the demand curve above that quantity.

- Monopoly creates deadweight loss: price exceeds marginal cost, so some mutually beneficial trades do not happen.
- Price discrimination - charging different prices to different buyers (airlines, student discounts) - can raise profit; perfect price discrimination eliminates deadweight loss.
- Natural monopolies are often regulated: average-cost pricing or marginal-cost pricing with subsidy.

Lecture 19: Monopolistic Competition

Key terms: product differentiation, excess capacity, non-price competition

Monopolistic competition combines many sellers with differentiated products (restaurants, clothing brands, soap). Each firm has a little market power, so its demand curve slopes downward but is fairly elastic because substitutes exist. Entry is relatively easy.

Short run: firms can earn profit or loss ($MR = MC$ pricing like a monopolist). Long run: entry of new firms shifts each firm's demand left until it is tangent to ATC - zero economic profit, but unlike perfect competition the tangency is not at minimum ATC, so there is excess capacity.

- Firms compete through product differentiation, advertising and branding - non-price competition.

- Welfare: consumers get variety, but pay slightly above marginal cost and firms do not produce at minimum cost.

Lecture 20: Oligopoly and Game Theory Basics

Key terms: interdependence, kinked demand, prisoners' dilemma, Nash equilibrium

Oligopoly is a market with a few large sellers whose decisions are interdependent (mobile networks, airlines, cement). Each firm must anticipate rivals' reactions. Outcomes range from fierce competition to collusion (cartels like OPEC).

- The kinked demand curve model explains price rigidity: rivals match price cuts but not price rises.
- The prisoners' dilemma shows why cartels are unstable: each member gains by cheating on the agreement, so all cheat and all are worse off.
- Game theory tools: dominant strategy, Nash equilibrium (each player's best response to others' strategies).

EXAM POINTER: Construct a simple 2x2 payoff matrix (e.g. two firms choosing high/low price) and find the Nash equilibrium. Explain why it differs from the collusive outcome.

Lecture 21: Markets for Factor Inputs: Labour Demand

Key terms: law of demand, ceteris paribus, substitution effect, income effect, normal vs inferior goods

Firms demand inputs to produce output. The demand for labour is a derived demand - derived from the demand for the product. A competitive firm hires labour up to the point where the marginal revenue product of labour equals the wage: $MRPL = W$. $MRPL = MPL \times MR$ (or $MPL \times P$ for a competitive firm).

- The labour demand curve is the downward-sloping MRPL curve (diminishing marginal product).
- It shifts with: the price of output, productivity/technology, and prices of other inputs (substitutes vs complements).
- A monopsonist (single buyer of labour) pays below the competitive wage - relevant for company towns and some labour markets.

Lecture 22: Labour Supply, Wages and Income Distribution

Key terms: law of supply, input prices, technology, taxes, subsidies

Individuals supply labour by trading off leisure against income. Higher wages have a substitution effect (work more, leisure is costlier) and an income effect (work less, you can afford more leisure). The labour supply curve may bend backward at high wages when the

income effect dominates.

- Wage differences reflect: human capital (education, training), compensating differentials (risk, unpleasantness), discrimination, and luck/connections.
- Economic rent is payment above what is needed to keep a factor in its current use.
- Marginal productivity theory: in competitive markets each factor is paid its marginal revenue product - a basis for analysing income distribution.

Lecture 23: Externalities and Market Failure

Key terms: negative/positive externalities, Coase theorem, Pigouvian tax

An externality is a cost or benefit of an activity that falls on third parties. Negative externalities (pollution, congestion): social cost exceeds private cost, so the market over-produces. Positive externalities (education, vaccinations): social benefit exceeds private benefit, so the market under-produces.

- Private solutions: Coase theorem - if property rights are clear and bargaining is costless, parties can negotiate an efficient outcome regardless of who holds the rights.
- Public policies for negative externalities: corrective (Pigouvian) taxes equal to the external cost, tradable pollution permits, direct regulation.
- Public policies for positive externalities: subsidies, public provision.

EXAM POINTER: Draw the negative-externality diagram: MSC above MPC, market quantity exceeds the socially optimal quantity; shade the deadweight loss triangle.

Lecture 24: Public Goods and Common Resources

Key terms: excludability, rivalry, free-rider problem, tragedy of the commons

Goods differ in excludability (can non-payers be excluded?) and rivalry (does one person's use reduce another's?). Private goods are excludable and rival; public goods (national defence, street lights) are non-excludable and non-rival; common resources (fisheries, clean air) are rival but non-excludable; club goods are excludable but non-rival.

- Public goods suffer the free-rider problem: people benefit without paying, so markets under-provide them - a core justification for government.
- Common resources suffer the tragedy of the commons: each user ignores the cost imposed on others, leading to overuse and depletion.
- Solutions for commons: regulation, corrective taxes, tradable quotas, or assigning property rights.

Lecture 25: Taxation, Government Intervention and Welfare

Key terms: price ceiling, price floor, tax incidence, deadweight loss

Governments intervene with price controls, taxes and subsidies. A price ceiling (e.g. rent control) set below equilibrium creates shortages and reduces gains from trade; a price floor (e.g. minimum wage) set above equilibrium creates surpluses (unemployment in labour markets).

- A tax drives a wedge between buyers' price and sellers' price; quantity falls and deadweight loss (a triangle) arises. The more elastic the curves, the bigger the deadweight loss.
- Tax incidence (who really bears the tax) depends on relative elasticities: the more inelastic side bears more of the burden - regardless of who legally pays.
- Subsidies have mirror effects: they raise quantity beyond the efficient level, creating deadweight loss.

EXAM POINTER: Show with a diagram that the burden of a tax falls more heavily on the less elastic side of the market, and shade the deadweight loss.

Lecture 26: International Trade Basics

Key terms: comparative advantage, tariffs, quotas, winners and losers

Countries trade because of comparative advantage. When a country opens to trade, domestic price moves toward the world price. If the world price is below the domestic autarky price, the country imports: consumers gain more than producers lose, so total welfare rises. Exporters gain symmetrically when the world price is above.

- Tariffs (taxes on imports) and quotas (limits on import quantities) raise domestic price, helping producers but hurting consumers more - net welfare loss.
- Arguments for protection: national security, infant industries, unfair competition - but economists stress the costs usually exceed the benefits.
- Trade creates winners and losers within a country, which is why trade policy is politically contentious even when total gains are positive.

Lecture 27: Economic Systems: Capitalism, Socialism and Mixed Economies

Key terms: market economy, command economy, mixed economy, price mechanism

An economic system is the set of institutions that answers the three basic questions: what to produce, how to produce, and for whom to produce. In a market (capitalist) economy these questions are answered mainly by the price mechanism - the interaction of supply and demand. In a command (socialist) economy they are answered by central planning. Most real

economies, including Pakistan's, are mixed economies combining markets with government intervention.

- Advantages of markets: efficiency, innovation, consumer choice. Disadvantages: inequality, externalities, public-goods under-provision, instability.
- Advantages of planning: coordination toward social goals, less inequality in theory. Disadvantages: information problems, lack of incentives, bureaucracy.
- The role of government in a mixed economy: providing public goods, correcting externalities, stabilising the economy, and redistributing income.

EXAM POINTER: Compare how a market economy and a command economy answer the three basic economic questions, with one strength and one weakness of each.

Lecture 28: The Price Mechanism and Resource Allocation

Key terms: rationing, signalling, incentive functions, invisible hand

The price mechanism rations scarce goods to those willing to pay most, signals producers about what consumers want, and creates incentives to economise and innovate. When demand for a good rises, its price rises; the higher price rations the good among buyers and signals producers to supply more - resources move toward their most valued uses without any central direction. Adam Smith called this the 'invisible hand'.

- Rationing function: prices allocate limited supply among competing buyers.
- Signalling function: price changes convey information about scarcity and demand.
- Incentive function: high prices reward producers who expand supply and consumers who cut back.

EXAM POINTER: Explain the three functions of prices with the example of a sudden rise in the price of wheat in Pakistan.

Lecture 29: Income and Substitution Effects

Key terms: substitution effect, income effect, Giffen good

When the price of a good falls, quantity demanded rises for two reasons. The substitution effect: the good is now cheaper relative to alternatives, so consumers substitute toward it. The income effect: the price fall raises the consumer's real purchasing power, so they buy more of normal goods. For a normal good both effects work in the same direction; for an inferior good they work in opposite directions.

- A Giffen good is a theoretical extreme: an inferior good so important in the budget that the income effect outweighs the substitution effect, making the demand curve slope upward.

- Hicksian decomposition separates the two effects using a compensated budget line - a standard diagram question.
- Practical use: understanding why demand for staples responds weakly to price changes in low-income households.

Lecture 30: Isoquants, Isocosts and Least-Cost Production

Key terms: production function, TP/MP/AP, diminishing marginal returns, stages of production

In the long run the firm chooses both labour and capital. An isoquant shows all input combinations that produce the same output - like an indifference curve for producers. It slopes downward and is convex because of diminishing marginal rate of technical substitution. An isocost line shows all input combinations the firm can afford: $wL + rK = C$.

Least-cost production is at the tangency of the isoquant and the lowest attainable isocost line, where $MRTS = w/r$, equivalently $MPL/w = MPK/r$ - the marginal product per rupee must be equal across inputs. This mirrors the consumer's equi-marginal principle.

EXAM POINTER: Draw an isoquant-isocost diagram and show the effect of a rise in the wage rate on the firm's chosen input mix.

Lecture 31: Returns to Scale

Key terms: increasing/constant/decreasing returns, Cobb-Douglas

Returns to scale describe what happens to output when all inputs are increased together. Increasing returns: output rises more than proportionately (doubling inputs more than doubles output). Constant returns: output rises proportionately. Decreasing returns: output rises less than proportionately. Returns to scale are a long-run, technological property - distinct from diminishing marginal returns, which is short-run.

- Sources of increasing returns: specialisation, indivisible equipment, geometric relationships (a bigger oil tanker needs less than double the steel).
- Decreasing returns at very large scale come from coordination and management problems.
- The Cobb-Douglas production function $Q = AL^aK^b$ shows returns to scale through $a + b$: greater than 1 means increasing returns.

Lecture 32: Cartels, Collusion and Competition Policy

Key terms: cartel, tacit collusion, competition policy, leniency

A cartel is a group of firms that agrees to restrict output and raise price, acting like a shared monopoly (OPEC is the famous example). Cartels are inherently unstable because each

member can profit by secretly producing more than its quota - the prisoners' dilemma in action. Tacit collusion (without explicit agreement) can also sustain high prices when firms interact repeatedly.

- Competition (antitrust) policy: laws against price-fixing, market-sharing and abuse of dominance; merger review to prevent excessive concentration.
- In Pakistan, the Competition Commission of Pakistan (CCP) enforces the Competition Act 2010.
- Leniency programmes - reduced penalties for the first cartel member to confess - are a powerful tool for destabilising cartels.

Lecture 33: Regulating Monopoly

Key terms: barriers to entry, $MR < P$, deadweight loss, price discrimination, natural monopoly

Because unregulated monopolies restrict output and charge above marginal cost, governments intervene. Options include: breaking the monopoly up, regulating its price, or public ownership. For natural monopolies (where one firm is cheapest), price regulation is common: marginal-cost pricing is efficient but forces a loss (since $MC < ATC$), requiring a subsidy; average-cost pricing lets the firm break even but leaves some deadweight loss.

- Rate-of-return regulation caps the firm's profit rate; price-cap regulation ($RPI - X$) gives stronger incentives to cut costs.
- Deregulation and introducing competition (e.g. in telecoms and airlines) have often benefited consumers more than regulation.
- Regulatory capture - when the regulator starts serving the industry instead of consumers - is a constant risk.

Lecture 34: Capital, Interest and Investment Decisions

Key terms: present value, NPV, investment demand

Capital is produced means of production - machines, buildings, software. Firms invest when the expected return exceeds the cost of funds. The interest rate is the price of borrowing: it rations credit, signals the scarcity of funds, and rewards saving. Present value translates future returns into today's terms: $PV = FV/(1+r)^t$.

A project is worth undertaking if its net present value (NPV) is positive: the discounted stream of expected profits exceeds the initial cost. Higher interest rates lower NPV, so investment falls when interest rates rise - the downward-sloping investment demand curve.

EXAM POINTER: Numerical: compute the NPV of a project costing Rs. 100,000 that returns Rs. 60,000 in each of the next two years at a 10% discount rate. Should the firm invest?

Lecture 35: Poverty, Inequality and the Welfare State

Key terms: Lorenz curve, Gini coefficient, equity-efficiency trade-off

Economists measure inequality with the Lorenz curve (cumulative income shares) and the Gini coefficient (0 = perfect equality, 1 = maximum inequality). Poverty can be absolute (below a fixed income line) or relative (below a fraction of median income). Pakistan's poverty headcount and the Benazir Income Support Programme are standard local examples.

- Causes of inequality: differences in human capital, inherited wealth, discrimination, and market luck.
- Redistribution tools: progressive taxation, cash transfers, public education and health - but redistribution can blunt work and investment incentives (the equity-efficiency trade-off).
- The welfare state combines social insurance (unemployment, pensions) with a safety net for the poorest.

Lecture 36: Behavioural Economics: Biases and Nudges

Key terms: loss aversion, present bias, anchoring, nudges

Behavioural economics studies how real people deviate from perfect rationality. Common biases: loss aversion (losses hurt about twice as much as equal gains please), status-quo bias, anchoring (over-relying on the first number seen), and present bias (overvaluing immediate rewards - why students procrastinate).

- Framing effects: the same choice described differently leads to different decisions.
- Nudges - small design changes like default enrolment in pension schemes or placing healthy food at eye level - can improve choices without restricting freedom.
- Firms exploit biases too: 'sale' anchors, drip pricing, and subscription traps are applications of behavioural insights in marketing.

EXAM POINTER: Define loss aversion and present bias, and give one real-life example of each from consumer or student behaviour.

Lecture 37: Asymmetric Information: Adverse Selection and Moral Hazard

Key terms: lemons problem, signalling, screening

Markets work best when buyers and sellers are well informed. Asymmetric information - when one side knows more than the other - can cause market failure. In the used-car market (Akerlof's 'lemons' problem), sellers know the car's quality but buyers do not; buyers therefore offer only an average price, which drives good cars out of the market.

- Adverse selection: hidden characteristics - e.g. only high-risk people buy generous health insurance, raising premiums and driving out low-risk people.
- Moral hazard: hidden actions - e.g. an insured driver may drive less carefully because the insurer bears the cost.
- Market responses: signalling (education as a signal of worker quality), screening, warranties, and government regulation such as mandatory disclosure.

EXAM POINTER: Explain the lemons problem with a numerical example and describe two ways markets or governments respond to asymmetric information.

Lecture 38: Revision I: Midterm-Style Practice Questions

Key terms: practice, midterm pattern

Use these questions to test your preparation for the midterm examination. Attempt each in writing before checking your handout notes.

1. Define opportunity cost and illustrate it with a PPF diagram. (5 marks)
2. Distinguish between a change in demand and a change in quantity demanded, with diagrams. (5 marks)
3. The price of a good falls from Rs. 20 to Rs. 16 and quantity demanded rises from 100 to 140 units. Calculate price elasticity of demand using the midpoint formula and state whether demand is elastic or inelastic. (5 marks)
4. Explain consumer equilibrium using the equi-marginal principle with a numerical example. (5 marks)
5. Draw and explain the short-run cost curves, showing why MC cuts AVC and ATC at their minimum points. (10 marks)

Lecture 39: Revision II: Final-Term-Style Practice Questions

Key terms: practice, midterm pattern

These longer questions mirror the final-term paper pattern. Write full answers with labelled diagrams where asked.

1. Compare perfect competition, monopoly, monopolistic competition and oligopoly on: number of firms, nature of product, barriers to entry, and long-run profit. Present your answer as a table. (10 marks)
2. A competitive firm faces $P = \text{Rs. } 50$, with $TC = 2Q^2 + 10Q + 32$. Find the profit-maximising output, and determine whether the firm should produce or shut down in the short run. (10 marks)

3. Explain, with diagrams, how a negative externality in production leads to market failure, and evaluate two government policies to correct it. (10 marks)
4. Using indifference-curve analysis, derive the demand curve for good X and decompose the effect of a price fall into substitution and income effects. (10 marks)
5. Discuss whether monopoly is always bad for consumers. Consider price discrimination, innovation, and natural monopoly in your answer. (10 marks)

Lecture 40: Key Diagrams and Formula Sheet

Key terms: exam diagrams, key formulas

Must-practice diagrams

- PPF; demand/supply shifts and equilibrium; price ceiling/floor; tax wedge with deadweight loss.
- Indifference curve + budget line tangency; cost curves (AFC/AVC/ATC/MC); perfect competition short-run and long-run.
- Monopoly $MR=MC$; negative externality (MSC vs MPC); labour market equilibrium.

Key formulas

- $E_d = (\% \Delta Q_d) / (\% \Delta P)$; $E_s = (\% \Delta Q_s) / (\% \Delta P)$; income elasticity; cross elasticity.
- Utility maximisation: $MU_x/P_x = MU_y/P_y$. Profit maximisation: $MR = MC$.
- Consumer surplus = willingness to pay minus price; GDP is a macro concept - do not confuse with micro aggregates.

EXAM POINTER: In the exam, always label axes, curves and equilibria on diagrams, and write 2-3 lines explaining what the diagram shows. A well-drawn labelled diagram with brief explanation earns most of the marks.

End of Handout - Good luck with your exams!