	Title: Microchips 1
Lecture Outline	• Microchip crisis. • 1.Microchip (mc) ind. / 2.manuf. /3. econ. of mc /4. change.
Background	• Mc =most devices = 1 of the most manuf. items in the wld. • 2020, (ASML) >932bn chips manuf.= $484bn.
Semi-conductor (sc) Decline	• Semiconductors (sc) manuf ↓ west. ↑China, Jap., S Kor. & Taiw. = 60% of global sc sales, • Hg shortage = every elect. device. • WHY? Over-reliance on the manuf. in Asia & demand for the UTD tech.
How mcs are manufactured 1947 Why silicon?	• Mc = sc memory chip or integrated circuit. • Made of silicon (sand). 1bn transistors on 1 chip. • 1947 = 1st first silicon transistor. • Before 1947 = vacuum tubes. • Reason 4 silicon = good sc. Mix other metals → elect. current on or off.
Challenges	• Making mcs = xtrml chlg. • King et al. (2021) plants take years to build. • mc rooms = sterile as an operating theatre. 1 tiny dust particle or hair can impair the intricate systems. • Variables = temperature, pressure, or magnetic fields.
Process	• Convert. silicon powder into discs = silicon wafers / printing the circuits by robots. • 1 chip = 1,000 & 2,000 steps = 3 months. • EXP: demand → outstripping supply.

Summary
There is a microchip crisis due to demand outstripping supply caused by consumers wanting the next best gadget. This is also exacerbated by most of the manufacturing of mcs is mainly in Asia. The manufacturing of mcs is extremely challenging because rooms need to be completely controlled as sterile environments controlling pressure, temp and magnetic field but also the process can take 2,000 steps over 3 months to produce just one chip.

Title: Microchips 2	
Economics of the MC industry	• Demand grows → costs. Ind. worth = proliferate year on year. • Fabrication plants → constant op. • Cost $15bn → 50,000 wafers. • Cost $20bn adv. facs. → Intel, Samsung & TSMC (the Taiwan Semiconductor Manufacturing Company) • Inv. & perseverance = 3 years to begin const.
Obsolete Market dominance	• Kaur (2021), the chips = obsolete quickly. • Lucrative = yld >90% & a profit $3bn = xtrml diff. • Also, mkt dominated by the 3 co.= $188bn in 2020. • > next 12 lrgst chipmakers comb.
Catch-22 **Unchallenged**	• Current lack of mcs → slow down ind. = delay prod. • Press. to meet these demands as quickly as possible. • HOWEVER, largest companies remain unchallenged → chipmakers in other parts of the world = bankruptcy
Summary and solutions	• Relying on a sm no. manufrs. to prod. the maj. of the wrld's chips is econ. unviable. • Govn. → risks → self-suff. in mc manuf. • Need time, money & patience. • Shortage of mcs from 2020 = more years to come.

Summary
As demand for mcs grows, so do profits. The initial costs of setting up and running a mc plant are astronomical meaning that the big three industries dominate the market. The production is extremely lucrative with profits of $3bn but chips become obsolete quickly and plants need to run all the time and need to be continuously upgraded with the latest advanced facilities. Because of these costs, the big 3 companies control the market and remain unchallenged. The lecturer claims that relying on 3 main manufacturers is economically unviable and governments around the world should create their own mc manufacturing plants so they can be more self-sufficient.