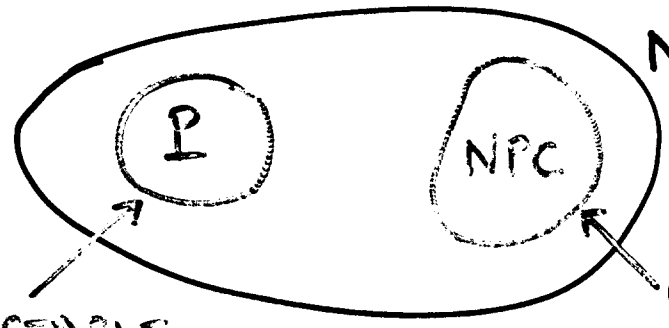
COURSE SUMMARY

COMPLEXITY THEORY AND INTRACTABILITY



TRACTABLE PROBLEMS

NP-COMPLETE PROBLEM

CONSIDERED / PRESUMED TO BE INTRACTABLE

TECHNIQUES FOR DEALING WITH NP-COMPLETE PROBLEMS:

- **EFFICIENT ALGORITHMS FOR SPECIAL CASES** EX: m-COLOURING IS NP-COMPLETE. BUT 2-COLOURING CAN BE SOLVED EFFICIENTLY.

- **APPROXIMATION ALGORITHMS**
  - FOR OPTIMIZATION PROBLEMS
  - EFFICIENT ALGORITHMS (POLYNOMIAL TIME)
  - OPTIMAL SOLUTION IS APPROXIMATED

APPROX. RATIO: $\rho(n)$

MAXIMIZATION:

$$\frac{C^*}{C} \leq \rho(n)$$

MINIMIZATION:

$$\frac{C}{C^*} \leq \rho(n)$$