

# PROBABILITY

$\Omega$  = set of all possible outcomes

Example  $\Omega = \{E_1, E_2, E_3, E_4, E_5\}$

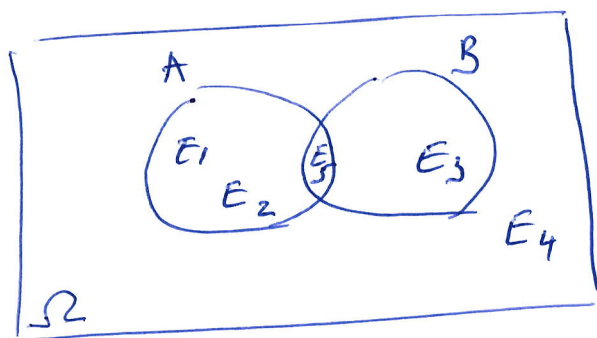
Union of events:  $A \cup B$   $\Leftarrow$  A OR B

If  $A = \{E_1, E_2, E_5\}$   $C = \{E_3\}$   
 $B = \{E_3, E_5\}$

$A \cup B = \{E_1, E_2, E_3, E_5\}$

$A \cap B = \{E_5\}$   $\Leftarrow$  intersection of events  $\Leftarrow$  A and B

Venn diagram:



$$P(A \cup B) =$$

$$P(A) + P(B) - P(A \cap B)$$

Complement of A: denoted  $A^c$  or  $\bar{A}$

$A^c \equiv \bar{A} = \{E_3, E_4\}$   $\Leftarrow$  all elements not in A

Mutually exclusive events:

$$A \cap C = \emptyset \quad \& \quad \text{no common element}$$

Conditional probability:  $P(A|B) = \frac{P(A \cap B)}{P(B)}$

Independence

$$P(A|B) = \frac{P(A \cap B)}{P(B)} = P(A) \Rightarrow$$

$P(A \cap B) = P(A) \cdot P(B)$  for  
Independent events