MODULE 2:

#PROPOSITIONAL LOGIC:

If any statement is a declarative statement with outcome true or false, then declarative sentence called a proportion.

- Logical connectives or logical operators.

(i) Conjunction (AND)
(ii) Disjunction (OR)
(iii) Negation (NOT)

The truth value of any proposition are the logical outcomes of the statements which can be denoted by true or false OR 1 or 0. ∴ Combining 2 or more propositions we may generate truth table.

TRUTH TABLES:

(i) Conjunction (AND)

p	q	$p \wedge q$
T	T	T
T	F	F
F	T	F
F	F	F

(ii) Disjunction (OR)

p	q	$p \vee q$
T	T	T
T	F	T
F	T	T
F	F	F

(iii) Negation (NOT)

p	$\neg p$
T	F
F	T

- Conditional Operator:

(i) Implication:

The implication of a statement p into a statement q is defined as $p \rightarrow q$, means if p then q. The p truth table is given by,

p	q	$p \rightarrow q$
T	T	T
T	F	F
F	T	T
F	F	T

(ii) Contrapositive :

If any implication is of the form $p \to q$, then its contrapositive will be given as $\neg q \to \neg p$. The implication statement is [if the 2nd year students are very naughty then I would love to take this class]

The contrapositive version is -

If I would not love to take this class then the 2nd year students are not naughty.

Truth table of is given by -

p	q	$p \to q$	$\neg q \to \neg p$
T	T	T	T
T	F	F	F
F	T	T	T
F	F	T	T

(iii) Converse :

If an implication is given in the form $p \to q$, then the converse will be of the form $q \to p$.

(iv) Inverse :

If an implication is of the form $p \to q$, then the inverse will be of the form $\neg p \to \neg q$.

The truth table is given by -

p	q	$\neg p \to \neg q$
T	T	T
T	F	T
F	T	F
F	F	T

TAUTOLOGY:

In a compound statement of 2 or more propositions with the application of 1 or more logical and conditional connectives if all the outcomes of a truth table comes true (T), then this compound proposition is called a tautology. and if all outcomes will come False (F), then it is called a contradiction