

| LOGIC (SYNTAX)                 |  | MODEL THEORY (FORMAL SEMANTICS)  |  |
|--------------------------------|--|----------------------------------|--|
| 1 <sup>st</sup> order language | $L = \langle C, P \rangle$             | model (structure) for language L | $M = \langle D, I \rangle$                             |
|                                |  | domain, universe (of discourse)  | $dom(M) = D$   |
| set of constants               | $const(L) = C$                         | interpretation (valuation)       | $I : const(L) \rightarrow dom(M)$                      |
| set of predicate symbols       | $pred(L) = P$                          |                                  | $I : pred(L) \rightarrow \wp tuple(dom(M))$            |
| valence                        | $val_L : pred(L) \rightarrow Nat_{no}$ |                                  |  |
| set of formulas                | $fmla(L)$                              | extended interpretation          | $I : fmla(L) \rightarrow \wp tuple(dom(M))$            |
| set of sentences               | $sent(L) \subseteq fmla(L)$            |                                  | $I : sent(L) \rightarrow truth = \wp 1 \cong \{f, t\}$ |
| variable                       | $x \in var$                            |                                  |  |
| constant                       | $c \in const(L)$                       | element, member                  | $I[c] \in dom(M)$                                      |
| predicate (relation) symbol    | $p \in pred(L), val_L(p) = n$          | predicate, relation              | $I[p] \subseteq dom(M)^n$                              |
| formula                        | $\varphi \in fmla(L)$                  | predicate, relation              | $I[\varphi] \subseteq dom(M)^n$                        |
| sentence                       | $\sigma \in sent(L)$                   | truth value                      | $I[\sigma] \in truth$                                  |
| theory                         | $\Sigma \subseteq sent(L)$             |                                  |  |
| entailment                     | $\Sigma \vdash \sigma$                 |                                  |  |
|                                |  | satisfaction                     | $M \models \sigma$                                     |
| theory of a model              | $th(M)$                                |                                  |  |
| models of a theory             | $mod(\Sigma)$                          |                                  |  |