**Class Diagram Representation**

Student

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UndergraduateStudent GraduateStudent

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Freshman Sophomore Junior MastersStudent DoctoralStudent

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ThesisStudent

**Class Descriptions**

* **Student** (Superclass)
  + Represents a general class of all students in the university.
* **UndergraduateStudent** (Subclass of Student)
  + Represents undergraduate students.
  + **Freshman** (Subclass of UndergraduateStudent)
    - First-year undergraduate students.
  + **Sophomore** (Subclass of UndergraduateStudent)
    - Second-year undergraduate students.
  + **Junior** (Subclass of UndergraduateStudent)
    - Third-year undergraduate students.
* **GraduateStudent** (Subclass of Student)
  + Represents graduate students.
  + **MastersStudent** (Subclass of GraduateStudent)
    - Graduate students pursuing master's degrees.
    - **ThesisStudent** (Subclass of MastersStudent)
      * Masters students who are writing a thesis.
  + **DoctoralStudent** (Subclass of GraduateStudent)
    - Graduate students pursuing doctoral degrees.

**Relationships Between Classes**

* **IS-A Relationships**:
  + **Student** is the parent class for all student types, so every subclass (UndergraduateStudent and GraduateStudent) is a type of Student.
  + **UndergraduateStudent** and **GraduateStudent** indicate that they are specific types of Student.
  + **Freshman**, **Sophomore**, and **Junior** are specific types of UndergraduateStudents, providing a further refined class structure for undergraduate classifications.
  + **MastersStudent** and **DoctoralStudent** extend the GraduateStudent class to classify students by their specific degree routes.

**Summary of Relationships**

* The hierarchy indicates a clear **is-a** relationship:
  + A **Freshman** is an UndergraduateStudent.
  + A **Sophomore** is an UndergraduateStudent.
  + A **Junior** is an UndergraduateStudent.
  + A **MastersStudent** is a GraduateStudent.
  + A **ThesisStudent** is a MastersStudent.
  + A **DoctoralStudent** is a GraduateStudent.

This structured hierarchy helps in comprehending the categorization of different types of students and their relationships. It effectively illustrates how general classes can be specialized into various subclasses, facilitating better organization and management in university systems.