Relational Mapping:

The relational mapping diagram for CUETSphere effectively illustrates the database structure and the interconnections between different entities. The extensive use of foreign keys throughout the schema is critical for maintaining data consistency, preventing orphaned records, and enabling complex queries that can retrieve related information across multiple tables. This design ensures a robust and well-organized foundation for the CUETSphere application.

Foreign Key Relationships:

Foreign keys are crucial for linking data between tables, ensuring referential integrity, and enabling efficient querying of related information.

- **Users to Departments:**
  - `u_dept_id` in the `Users` table is a foreign key referencing `dept_id` in the `Departments` table. This indicates which department a user belongs to.
- **Courses to Departments and Semesters:**
  - `c_dept_id` in the `Courses` table is a foreign key referencing `dept_id` in the `Departments` table. This links a course to its offering department.
  - `c_semester_id` in the `Courses` table is a foreign key referencing `semester_id` in the `Semesters` table. This connects a course to the specific semester it's offered in.
- **Resources to Courses, Users, and Departments:**
  - `R_course_id` in the `Resources` table is a foreign key referencing `course_id` in the `Courses` table. This indicates which course a resource belongs to.
  - `uploader_id` in the `Resources` table is a foreign key referencing `sid` in the `Users` table. This identifies the user who uploaded the resource.
  - `R_dept_id` in the `Resources` table is a foreign key referencing `dept_id` in the `Departments` table. This links a resource to a specific department.
- **Posts to Users:**
  - `p_user_id` in the `Posts` table is a foreign key referencing `sid` in the `Users` table. This identifies the author of a post.
- **Comments to Posts and Users:**
  - `c_post_id` in the `Comments` table is a foreign key referencing `post_id` in the `Posts` table. This associates a comment with a particular post.
  - `c_user_id` in the `Comments` table is a foreign key referencing `sid` in the `Users` table. This identifies the user who made the comment.
- **Upvotes_Downvotes to Users and Posts:**
  - `V_user_id` in the `Upvotes_Downvotes` table is a foreign key referencing `sid` in the `Users` table. This indicates which user cast the vote.
  - `V_post_id` in the `Upvotes_Downvotes` table is a foreign key referencing `post_id` in the `Posts` table. This indicates which post was voted on.
- **Notices to Users and Departments:**

- `sender_id` in the `Notices` table is a foreign key referencing `sid` in the `Users` table. This indicates the user who sent the notice.
- `N_department` in the `Notices` table is likely a foreign key referencing `dept_id` in the `Departments` table. This connects a notice to a specific department.

- **Notifications to Users:**
  - `NT_user_id` in the `Notifications` table is a foreign key referencing `sid` in the `Users` table. This ensures a notification is linked to a specific user.
- **Post_tag (Junction Table):**
  - `pt_post_id` in the `Post_tag` table is a foreign key referencing `post_id` in the `Posts` table.
  - `post_tag_id` in the `Post_tag` table is a foreign key referencing `tag_id` in the `Tag` table.
  - This junction table enables a many-to-many relationship, meaning a post can have multiple tags, and a tag can be associated with multiple posts.