course_id
CS-101

Figure 2.15 Courses offered in both the Fall 2017 and Spring 2018 semesters.

r as well as in s. As with the union operation, we must ensure that intersection is done between compatible relations.

Suppose that we wish to find the set of all courses taught in both the Fall 2017 and the Spring 2018 semesters. Using set intersection, we can write

$$\Pi_{course\_id}\ (\sigma_{semester = \text{“Fall”} \wedge year=2017}\ (section)) \cap \Pi_{course\_id}\ (\sigma_{semester = \text{“Spring”} \wedge year=2018}\ (section))$$

The result relation for this query appears in Figure 2.15.

The **set-difference** operation, denoted by $-$, allows us to find tuples that are in one relation but are not in another. The expression $r - s$ produces a relation containing those tuples in r but not in s.

We can find all the courses taught in the Fall 2017 semester but not in Spring 2018 semester by writing:

$$\Pi_{course\_id}\ (\sigma_{semester = \text{“Fall”} \wedge year=2017}\ (section)) - \Pi_{course\_id}\ (\sigma_{semester = \text{“Spring”} \wedge year=2018}\ (section))$$

The result relation for this query appears in Figure 2.16.

As with the union operation, we must ensure that set differences are taken between compatible relations.

2.6.7 The Assignment Operation

It is convenient at times to write a relational-algebra expression by assigning parts of it to temporary relation variables. The **assignment** operation, denoted by $\leftarrow$, works like assignment in a programming language. To illustrate this operation, consider the query to find courses that run in Fall 2017 as well as Spring 2018, which we saw earlier. We could write it as:

course_id
CS-347
PHY-101

Figure 2.16 Courses offered in the Fall 2017 semester but not in Spring 2018 semester.