Step-1

In every week the chemistry course taught in section A is $\frac{1}{4}$ course and in section B, it is $\frac{1}{3}$ course and $\frac{1}{6}$ of each section transfer to the other section.

Let T be the transition matrix.

In a markov transition matrix, each column adds to 1 and it has no negative entries.

Step-2

Let x_0 be the total number of students in section $A \to x$

Let y_0 be the total number of students in section $B \to y$

Let z_0 be the total number of students, who are in neither section (drop outs) $\to z$

The number of students in section A is given as,

$$\begin{aligned} x &= x_0 - \underbrace{\frac{x_0}{6}}_{\text{transferring}} - \underbrace{\frac{x_0}{4}}_{\text{dropping}} + \underbrace{\frac{y_0}{6}}_{\text{transferring from } B} \\ &= \frac{7x_0}{12} + \frac{y_0}{6} + 0 \cdot z_0 \end{aligned}$$

The number of students in section B is given as,

$$\begin{aligned} y &= y_0 - \underbrace{\frac{y_0}{3}}_{\text{dropping}} - \underbrace{\frac{y_0}{6}}_{\text{transferring}} + \underbrace{\frac{x_0}{6}}_{\text{transferring from } A} \\ &= \frac{x_0}{6} + \frac{y_0}{2} + 0 \cdot z_0 \end{aligned}$$

The number of students neither in in section A nor B is given as,

$$z = \underbrace{\frac{x_0}{4}}_{\text{transferring from } A} + \underbrace{\frac{y_0}{3}}_{\text{transferring from } B} + z_0$$

Therefore, the transition matrix for a chemistry course that is taught in section A and Section B is $\boxed{T = \begin{bmatrix} \frac{7}{12} & \frac{1}{6} & 0 \\ \frac{1}{6} & \frac{1}{2} & 0 \\ \frac{1}{4} & \frac{1}{3} & 1 \end{bmatrix}}$.