10.1 For $s < t < u$ we have

$$\begin{aligned}
\mathrm{E}_s\left[\varepsilon_t\right] &= \mathrm{E}_s\left[\mathrm{E}_{t-1}\left[\varepsilon_t\right]\right] = \mathrm{E}_s\left[0\right] = 0 \qquad (1)\\
\mathrm{Var}_s\left(\varepsilon_t\right) &= \mathrm{E}_s\left[\varepsilon_t^2\right] - \left(\mathrm{E}_s\left[\varepsilon_t\right]\right)^2 \overset{(1)}{=} \mathrm{E}_s\left[\varepsilon_t^2\right]\\
&\overset{\text{LawIE}}{=} \mathrm{E}_s\left[\mathrm{E}_{t-1}\left[\varepsilon_t^2\right]\right] \overset{(1)}{=} \mathrm{E}_s\left[\mathrm{E}_{t-1}\left[\varepsilon_t^2\right] - \left(\mathrm{E}_{t-1}\left[\varepsilon_t\right]\right)^2\right]\\
&= \mathrm{E}_s\left[\mathrm{Var}_{t-1}\left(\varepsilon_t\right)\right] = \mathrm{E}_s\left[1\right] = 1\\
\mathrm{Var}_s\left(\varepsilon_t, \varepsilon_u\right) &= \mathrm{E}_s\left[\left(\varepsilon_t - \mathrm{E}_s\left[\varepsilon_t\right]\right)\left(\varepsilon_u - \mathrm{E}_s\left[\varepsilon_u\right]\right)\right]\\
&\overset{(1)}{=} \mathrm{E}_s\left[\varepsilon_t\varepsilon_u\right] \overset{\text{LawIE}}{=} \mathrm{E}_s\left[\mathrm{E}_t\left[\varepsilon_t\varepsilon_u\right]\right] \overset{\text{LawCC}}{=} \mathrm{E}_s\left[\varepsilon_t\mathrm{E}_t\left[\varepsilon_u\right]\right]\\
&= \mathrm{E}_s\left[\varepsilon_t \times 0\right] = 0
\end{aligned}$$