Notation:

n_T : Total number of observations

r : number of classes

n_i : number of observations in the i^{th} class

$SD(\bar{Y}_{i.})$: standard deviation of $\bar{Y}_{i.}$

$\bar{Y}_{i.}$: average of observations in the i^{th} class

u_i : true mean of the i^{th} class.

$\hat{u}_i$: estimation of u_i, estimated mean of the i^{th} class.

MSE: Mean square error.

Explanation about df.

The reason that df of t is $n_T - r$ is we use SSE to get the SD and SSE has df of $n_T - r$. Note: df doesn't depend on the denominator, but depend on how much information you haven't used. For example, $\sum_{i=1}^{r} \sum_{j=1}^{n_i} (Y_{ij} - \bar{Y}_{i.})^2$, you have n_T free observations, but you already used 3 $\bar{Y}_{i.}$, which include information

$$\begin{cases} \sum_{j=1}^{n_1} (Y_{1j} - \bar{Y}_{1.}) = 0 \\ \sum_{j=1}^{n_2} (Y_{2j} - \bar{Y}_{2.}) = 0 \\ \sum_{j=1}^{n_3} (Y_{3j} - \bar{Y}_{3.}) = 0 \end{cases}$$

So, you only have $n_T - r$ information free.