MECHANICS OF COMPOSITE MATERIALS
AUTAR KAW
FORMULA SHEET FOR CHAPTER 3

$$\frac{E_2}{E_m}=\frac{1+\xi\eta V_f}{1-\eta V_f},\eta=\frac{(E_f/E_m)-1}{(E_f/E_m)+\xi},\xi=2$$

$$\frac{G_{12}}{G_m}=\frac{1+\xi\eta V_f}{1-\eta V_f},\eta=\frac{(G_f/G_m)-1}{(G_f/G_m)+\xi},\xi=1$$

$$(\sigma_1^c)_{ult}=\frac{E_1(\varepsilon_2^T)_{ult}}{\nu_{12}}$$ Matrix splitting

$$(\varepsilon_2^T)_{ult}=(\varepsilon_m^T)_{ult}(1-V_f^{1/3})$$

$$(\varepsilon_2^T)_{ult}=(\varepsilon_m^T)_{ult}\left[\frac{d}{s}\left(\frac{E_m}{E_f}-1\right)+1\right]$$

$$(\sigma_1^C)_{ult}=\min\left[2\left[V_f+(1-V_f)\frac{E_m}{E_f}\right]\sqrt{\frac{V_f E_m E_f}{3(1-V_f)}},\frac{G_m}{1-V_f}\right]$$

$$(\sigma_1^C)_{ult}=2\left[(\tau_f)_{ult}V_f+(\tau_m)_{ult}V_m\right]$$

$$(\sigma_2^T)_{ult}=E_2(\varepsilon_2^T)_{ult}$$

$$(\sigma_2^C)_{ult}=E_2(\varepsilon_2^C)_{ult}$$

$$(\tau_{12})_{ult}=G_{12}\left[\frac{d}{s}\frac{G_m}{G_f}+\left(1-\frac{d}{s}\right)\right](\gamma_m)_{ult}$$

$$\alpha_1=\frac{1}{E_1}(\alpha_f E_f V_f+\alpha_m E_m V_m)$$

$$\alpha_2=(1+\nu_f)\alpha_f V_f+(1+\nu_m)\alpha_m V_m-\alpha_1\nu_{12}$$

$$\beta_1=\frac{V_f E_f \Delta C_f \beta_f+V_m E_m \Delta C_m \beta_m}{E_1(V_m\rho_m\Delta C_m+V_f\rho_f\Delta C_f)}\rho_c$$

$$\beta_2=\frac{V_f(1+\nu_f)\Delta C_f\beta_f+V_m(1+\nu_m)\Delta C_m\beta_m}{(V_m\rho_m\Delta C_m+V_f\rho_f\Delta C_f)}\rho_c-\beta_1\nu_{12}$$