ECS455 2014 Formula Sheet

ID3	Limit: 40 symbols (or characters) per person.	536	Spreading Factor = $\frac{Tb}{Tc}$
053	FDMA: $s(t)=\sum_{k=0}^{l-1} S_k C(f-k\Delta f)$	555	$OFDM,\ \hat{s}=\sqrt{N}IFFT(S)$ $y=x*h$ $\hat{R}=\frac{1}{\sqrt{N}}FFT(r),\ S=\frac{\hat{R}}{H}$
089	ifwht(eye(N)): Hadamard to Walsh	567	**MulPathFad**Inc**La**FDM**Gurband** Orth**FFT**a**IFFT**
094	Engst Pm≠Pb, Pk= $\frac{\binom{n}{k}A_u^k}{\sum_{i=0}^{m}\binom{n}{i}A_u^i}$,n$\geq m\rightarrow 0$	575	$\Psi_N^{-(p-1)(q-1)}$; Ψ_N = e^(j2π/N); p-row,q-col(DFT)
095	From 555, $x=\hat{s}+CP$, $r=y-CP$	658	H_{2N} = [H_N H_N ; H_N (not)H_N]
104	p[runs of length L] = 1/(2^L), L<r = 1/(2^(L-1), L>=r r = polynomial order	667	**Irwin Jacobs (Cornell)**: Pioneer of Wireless Future
129	$s(t)=\sum_{k=0}^{N-1} S_k\frac{1}{\sqrt{N}}1_{[0,T_s]}(t)exp\left(j\frac{2\pi kt}{T_s}\right)$	682	$f_k=\frac{k}{T_s}$,CDMA:Qualcomm
154	Er.C: $\frac{A^k}{m!m^{(k-m)}}p_0, k\geq m$ $\frac{A^k}{k!}p_0, k<m$	683	$1+0x+x^2+x^3$ $R_0R_1R_2\rightarrow 100$ $(R_1+R_2)R_0R_1\rightarrow 010$
163	ErlangC: $\frac{A^m}{A^m+m!(1-\frac{A}{m})\sum_{k=0}^{m-1}\frac{A^k}{k!}}$	691	s(f)= $\sum_{k=0}^{l-1} S_kC_k$ where $C_{k1}\perp C_{k2}$
184	B = (½)RK, B = BW, R = Rate bits/sec, K = K-user orthogonal CDMA system	706	circular convolution cconv([1,2,3],[4,5,6],3) = 31 31 28
203	ErB. k+1:λδ k-1: $k\mu\delta$, **Andrew J.Viterbi**:Viterbi algorithm	734	$\frac{1}{N}\Psi_N^*X=IDFT\{X\}=x$ $x\Leftrightarrow X=DFT\{x\}=\Psi_N x$
209	Mutual Orthogonality $\forall i\neq j,\ \int c_i(t)*c_j(t)dt=0$	865	oversampling s[n]=s($n\frac{T_s}{N}$), $s^{[L]}$[n]=s($n\frac{T_s}{LN}$) L=over-sampling factor
253	Key CDMA Property: $\underline{s}\,C(=\sum_{k=1}^{N}s_k\underline{C}_k)\frac{1}{N}C^T=\underline{s}$	882	Our text authors: D. Tse, P .Visnavath, A.Goldsmith
290	$\oplus$: $same=0,\ different=1$	915	[1 2 3 0 0] cir.conv. [4 5 6 0 0] = [1 2 3]*[4 5 6]
296	An m - sequence covers all non-zero states in a cycle. 1) contain one more 1 than 0. 2) window width r can slide N=(2^r)-1 shifts	962	E.set k+1: $(n-k)\lambda_\mu\delta$ k-1: $k\mu\delta$
325	$h(t)=\sum_{t=0}^{v}\beta_i\delta(t-\tau_i)$	971	$Pb=Pm=\frac{\frac{A^m}{m!}}{\sum_{k=0}^{m}\frac{A^k}{k!}}$, A= $\lambda H, H=\frac{1}{\mu}$
361	S(f)=$\frac{1}{\sqrt{N}}\sum_{k=0}^{N-1}$ Sk $e^{-j2\pi(f-k\Delta f)\frac{T_s}{2}}\ T_s sinc(\pi T_s(f-k\Delta f))$	993	MKChain:0,0(1-λδ);0,1(λδ);1,1(1- μδ);1,0(μδ)
395	Engset P_b = (n-m)p_m / $\sum_{k=0}^{m}$ (n-k)p_k	998	Ortho <a,b> = $\overline{a}\ dot\ \overline{b} complexconj.\ =0$