Introduction to Network Statistics – Further Reading

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Obviously, as a 'chalk and talk' session, I don't have slides to make available, but I can provide some of the sources for my lectures and some references for further reading.

General Texts

The book that's clearly set to become the standard introductory text is:
Newman, M. E. J. *Networks, an Introduction*, OUP (2010).

Before this book, a review paper commonly used as an introduction to the field:
S. Boccaletti, et al., Complex networks: Structure and dynamics, *Physics Reports*, Volume 424, Issues 4-5, February 2006, Pages 175-308, DOI:10.1016/j.physrep.2005.10.009

At Warwick, we wrote a review paper on the application of these ideas to epidemiology:
L. Danon, A. P. Ford, T. House, C. P. Jewell, M. J. Keeling, G. O. Roberts, J. V. Ross and M. C. Vernon, "Networks and the Epidemiology of Infectious Disease," to appear in *Interdisciplinary Perspectives on Infectious Diseases* special issue "Network Perspectives on Infectious Disease Dynamics". [arXiv:1011.5950]

Relevant papers

As we found at Warwick while writing our review, even summarising network theory as applied to epidemics isn't completely possible in one paper. So the following list of papers is horribly uncomprehensive; all I can say is that these are nice papers to read as a starting point, which cite and are cited by many other interesting and important papers.

The classic **Erdös-Rényi** paper is:
P. Erdös and A. Rényi, *Publicationes Mathematicae*, Vol. 6 (1959), pp. 290-297.

The Molloy-Reed paper on the **configuration model** is:
M. Molloy and B. Reed. 1995. A critical point for random graphs with a given degree sequence. *Random Struct. Algorithms* 6, 2/3 (March 1995), 161-179.

Some papers on **assortativity** and **modularity** are:
M. E. J. Newman, M. Girvan, Mixing patterns and community structure in networks [arXiv:cond-mat/0210146]
M. E. J. Newman, Assortative mixing in networks [arXiv:cond-mat/0205405]
M. E. J. Newman, Mixing patterns in networks [arXiv:cond-mat/0209450]

The classic **small-world** paper is:
D. J. Watts, S. H. Strogatz, Collective dynamics of 'small-world' networks, *Nature* **393**, 440-442 (4 June 1998), doi:10.1038/30918

And the classic paper on **scale-free networks** is:
A-L. Barabási, R. Albert, Emergence of Scaling in Random Networks, Science 15 October 1999: Vol. 286 no. 5439 pp. 509-512 DOI:10.1126/science.286.5439.509

Motifs (order three directed and order four undirected) were counted for several real networks in:
R. Milo, S. Shen-Orr, S. Itzkovitz, N. Kashtan, D. Chklovskii, and U. Alon, Network Motifs: Simple Building Blocks of Complex Networks *Science*, 25 October 2002: 298 (5594), 824-827. [DOI:10.1126/science.298.5594.824]
R. Milo, S. Itzkovitz, N. Kashtan, R. Levitt, S. Shen-Orr, I. Ayzenshtat, M. Sheffer, and U. Alon, Superfamilies of Evolved and Designed Networks, *Science* 5 March 2004: 303 (5663), 1538-1542. [DOI:10.1126/science.1089167]

ERGMS are often considered in social science rather than physics / maths journals. A recent introductory paper is:
G. Robins, P. Pattison, Y. Kalish, D. Lusher, An introduction to exponential random graph (p*) models for social networks, *Social Networks*, Volume 29, Issue 2, Special Section: Advances in Exponential Random Graph (p*) Models, May 2007, Pages 173-191, DOI: 10.1016/j.socnet.2006.08.002.
A recent highly cited research paper is:
Snijders, T. A. B., Pattison, P. E., Robins, G. L. and Handcock, M. S. (2006), NEW SPECIFICATIONS FOR EXPONENTIAL RANDOM GRAPH MODELS. *Sociological Methodology*, 36: 99–153. doi: 10.1111/j.1467-9531.2006.00176.x

Good luck!