

Schedule for Independent Study (NRES 799) – R programming skill development

January-April 2019  
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The principal source for the readings is:

Venables, W. N., D. M. Smith and the R Core Team (2015): An Introduction to R (available online at: <https://cran.r-project.org/doc/manuals/r-release/R-intro.pdf>)

The list of scheduled readings includes (note: V15 refers to Venables et al. [2015]):

Dates	Readings	Topics	Assignments (A#) and Marks (/#)
7 Jan. 2019	R Backgrounder (handout), V15 – Chapters 1 and 2	Introduction to R, variables and vectors	V15 – Appendix A: A sample R session (no marks)
14 Jan. 2019	V15 – Chapters 3 and 4	Objects and ordered factors	<b>A1:</b> Introduction to R in hydrometeorology (/10)
21 Jan. 2019	V15 – Chapter 5	Arrays and matrices	<b>A1 report due 23 Jan.</b>
28 Jan. 2019	V15 – Chapter 6	Lists and data frames	<b>A2:</b> Watersheds and areal precipitation estimates (/10)
4 Feb. 2019	V15 – Chapter 7	Reading data from files	<b>A2 report due 6 Feb.</b> <b>A3:</b> Snow survey data analysis (/10)
11 Feb. 2019	V15 – Chapter 8	Probability distributions	<b>A3 report due 13 Feb.</b>
18 Feb. 2019	V15 – Chapter 9	Grouping, loops and conditional execution	<b>A4:</b> Stream discharge (/10)
25 Feb. 2019	V15 – Chapter 10	Writing your own functions	<b>A4 report due 27 Feb.</b>
4 Mar. 2019	V15 – Chapter	Statistical models in R	<b>A5:</b> Extreme events (/10)
11 Mar. 2019	V15 – Chapter 12	Graphical procedures	<b>A5 report due 13 Mar.</b>
18 Mar. 2019	V15 – Chapter 13	Packages	<b>A6:</b> Meteorological data analysis (/10)
25 Mar. 2019	No reading	<b>(Project)</b>	<b>A6 report due 27 Mar.</b>
			<b>Project due 11 Apr.</b>

**Grading** for the independent study will be as follows: six assignments each worth 10% (total of 60%) and one research project involving the use of R for data analysis, statistical analyses and visualization of results (40% of final mark). The topic and data to be used for the final project report will be discussed between the student and supervisor, and will address a topic relevant to the application of R to hydrometeorological data analysis and

visualization. The course supervisor will evaluate the assignments and project to provide a mark for each.

Other relevant references:

Collier, C. G. (2016): Hydrometeorology, Wiley Blackwell, 353 pp.

Dingman, S. L. (2002): Physical Hydrology (2<sup>nd</sup> edition), Prentice Hall, 646 pp.

Dunne, T. and Leopold, L. B. (1978): Water in Environmental Planning, W. H. Freeman and Company, 818 pp.

Hornberger, G. M., Raffensperger, J. P., Wiberg, P. L., and Eshleman, K. N. (1998): Elements of Physical Hydrology, Johns Hopkins University Press, 302 pp.