Topological string theory from variation of Hodge structure

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In these lectures I will introduce the variation of Hodge structure (VHS) of the middle dimensional cohomology of families of Calabi-Yau threefolds and the associated special Kähler geometry of the moduli space of complex structures. I will discuss how the mirror symmetry data of the B-side of mirror symmetry is encoded in the VHS and in particular how a geometric quantization problem leads to the formulation of the topological string partition function. The expansion of this partition function contains the information of the higher genus Gromov-Witten invariants of the mirror manifold. I will furthermore discuss the polynomial structure of the higher genus Gromov-Witten generating functions in terms of some special functions on the moduli spaces. I will explain how these special functions generalize the notion of quasi-modular forms.